SEISMOLOGICAL FIELD SURVEY

Coast and Geodetic Survey
Environmental Science Services Administration
U. S. Department of Commerce

EARTHQUAKE ENGINEERING RESEARCH LABORATORY

Division of Engineering and Applied Science
California Institute of Technology

STRONG-MOTION INSTRUMENTAL DATA ON THE BORREGO MOUNTAIN EARTHQUAKE OF 9 APRIL 1968

August, 1968

A Report Prepared With the Assistance of a
Grant from the Engineering Division of the

NATIONAL SCIENCE FOUNDATION

Strong-Motion Instrumental Data on the Borrego Mountain Earthquake of 9 April 1968

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Preface

The Borrego Mountain earthquake triggered 114 strong-motion accelerographs in the southern California region. Hitherto the maximum number of instruments in the Pacific Coast network which had simultaneously operated was 35 accelerographs during the main shock of the Kern County earthquakes of 1952.

The unprecedented nature of the instrumental coverage makes it desirable to ensure a prompt distribution of the complete basic data. As the first large scale test of the field installation and servicing conditions, as well as of the instruments themselves, the data are of unusual interest. Even though the large distance from the epicenter (135 miles) to the densest portion of the accelerograph network in the Los Angeles area resulted in many records of very low magnitude, significant studies of the distribution of ground motion can be made. In particular, the distribution pattern of the earthquake-triggered accelerographs gives valuable information on the characteristics and reliability of the starting devices incorporated into the instruments.

It will be noted that in addition to a number of important ground motion records at El Centro, San Diego, San Onofre, etc., numerous accelerograms were obtained in upper floor positions in tall buildings in

the Los Angeles region. Although these records show low acceleration levels, they permit accurate determination of building response period. It will be of great interest to compare these earthquake-excited period measurements with those obtained from other structural tests and from calculations.

Because of the general interest in instrumental characteristics as well as in the distribution of ground motion, it has been decided to reproduce photographs of all record traces, no matter how small the indicated motions. It is realized that the small scale of many of the figures precludes their direct use for accurate measurements. It is intended that they will serve as an index to the available records, and will indicate to a prospective investigator the particular records which he might wish to obtain in the full-scale form from the U. S. Coast and Geodetic Survey. Since only a limited number of full-scale records can be so distributed, the present report should thus contribute to an optimum use of existing data-handling capabilities. Requests for full-scale reproductions of the original accelerograms should be directed to:

Seismological Field Survey
Coast and Geodetic Survey
ESSA, Room 7067
390 Main Street
San Francisco, California 94105

Since means have not yet been found to enable the Seismological Field Survey to expand its activities in the preparation and distribution

of accelerograph records to the extent called for by the present size of the instrumental network, the present report is a cooperative effort with the California Institute of Technology under a grant from the Engineering Division of the National Science Foundation for basic studies in earthquake engineering.

W. K. Cloud, Chief
Seismological Field Survey

D. E. Hudson
California Institute of Technology

Acknowledgements

The high level of field reliability of the strong-motion instrumentation in the Pacific Coast network is a tribute to the staff of the Seismological Field Survey who have installed and serviced the instruments since the inception of the program in 1932. The acquisition of the instruments has been a cooperative effort involving the Seismological Field Survey, such organizations as the California Department of Water Resources, the Los Angeles Department of Water and Power, the Los Angeles County Flood Control District, the Southern California Edison Company, the California Institute of Technology, and numerous private building owners. Mention should also be made of the skill and care which has been put into the design and construction of the instruments by the Seismological Field Survey and by the manufacturing companies.

The installation and servicing of the network is under the general direction of B. J. Morrill, and the Southern California portion is the prime responsibility of R. P. Maley. The field staff of M. Engle, E. C. Etheridge, J. P. Martine, and G. F. Murray made notable contributions to the success of the installations.

The preparation of field data for the present report was carried out by C. F. Knudson of the Seismological Field Survey. The layout of the photographic reproductions of the accelerograms was organized by V. Perez of the Seismological Field Survey and A. G. Brady of the California Institute of Technology. Dr. Brady has also served as the general editor of the report.

The preparation and distribution of the report has been supported under Grant No. GK1197X from the Engineering Division of the National Science Foundation to the California Institute of Technology.

Operation of the Coast and Geodetic Survey Strong-Motion Seismograph Network During the Borrego Mountain, California, Earthquake of 9 April 1968

by

Richard P. Maley

Abstract

The magnitude 6.5 Borrego Mountain earthquake of 9 April 1968 triggered 114 strong-motion seismographs operated by the Coast and Geodetic Survey in southern California and southeastern Nevada. All instruments within 160 miles of the epicenter were actuated but beyond that distance the percentage of triggered seismographs decreased up to 235 miles, the maximum operating range for this earthquake. A breakdown of station locations show that records were obtained primarily from various levels within taller buildings and from numerous dam sites.

Considering the large number of instruments presently located in southern California and the current increase in installations, it is obvious that future earthquakes in the magnitude range of the Borrego Mountain earthquake will actuate in most cases upwards of 100 or more strong-motion seismographs. Since only 7 of the 114 records obtained were from sites less than 100 miles from the epicenter, it is suggested that a better geographic distribution of stations within the network, especially along the very active San Jacinto fault zone, would provide considerably more valuable strong-motion data during future earthquakes.

Introduction

The magnitude 6.5 Borrego Mountain earthquake of 9 April 1968 triggered the large majority of strong-motion seismographs in southern California and southeastern Nevada, an area generally bounded by the Pacific Ocean between San Diego and Santa Barbara on the west and El Centro to Las Vegas on the east. The limits of this region are for the most part consistent with those determined for the "generally felt" area encompassing approximately 60,000 square miles as determined from the Coast and Geodetic Survey questionnaire program. Unlike the eastern extension of the felt area into Arizona there were no records obtained in the southern portion of the Arizona-California border region simply because there is no strong-motion instrumentation other than seismoscopes located east of El Centro in the Colorado and Mojave Deserts. Several records were also obtained northwest and north of the generally felt area near Bakersfield and Las Vegas.

Operation of the Network

As shown in Figures 1 and 2 a total of 114 accelerographs were actuated within an epicentral radius of 235 miles. Table 1 is a tabulation of all records obtained from the earthquake listed according to numerically increasing distance from the epicenter. In the first 160 miles a total of 81 instruments operated including all stations in Los Angeles, whereas from 160 to 235 miles 21 of 28 of the standard network instruments operated. In addition records were also obtained from 2 of the 18 installations maintained by the Coast and Geodetic Survey Special Projects Party in Las Vegas 215 miles from the epicenter.

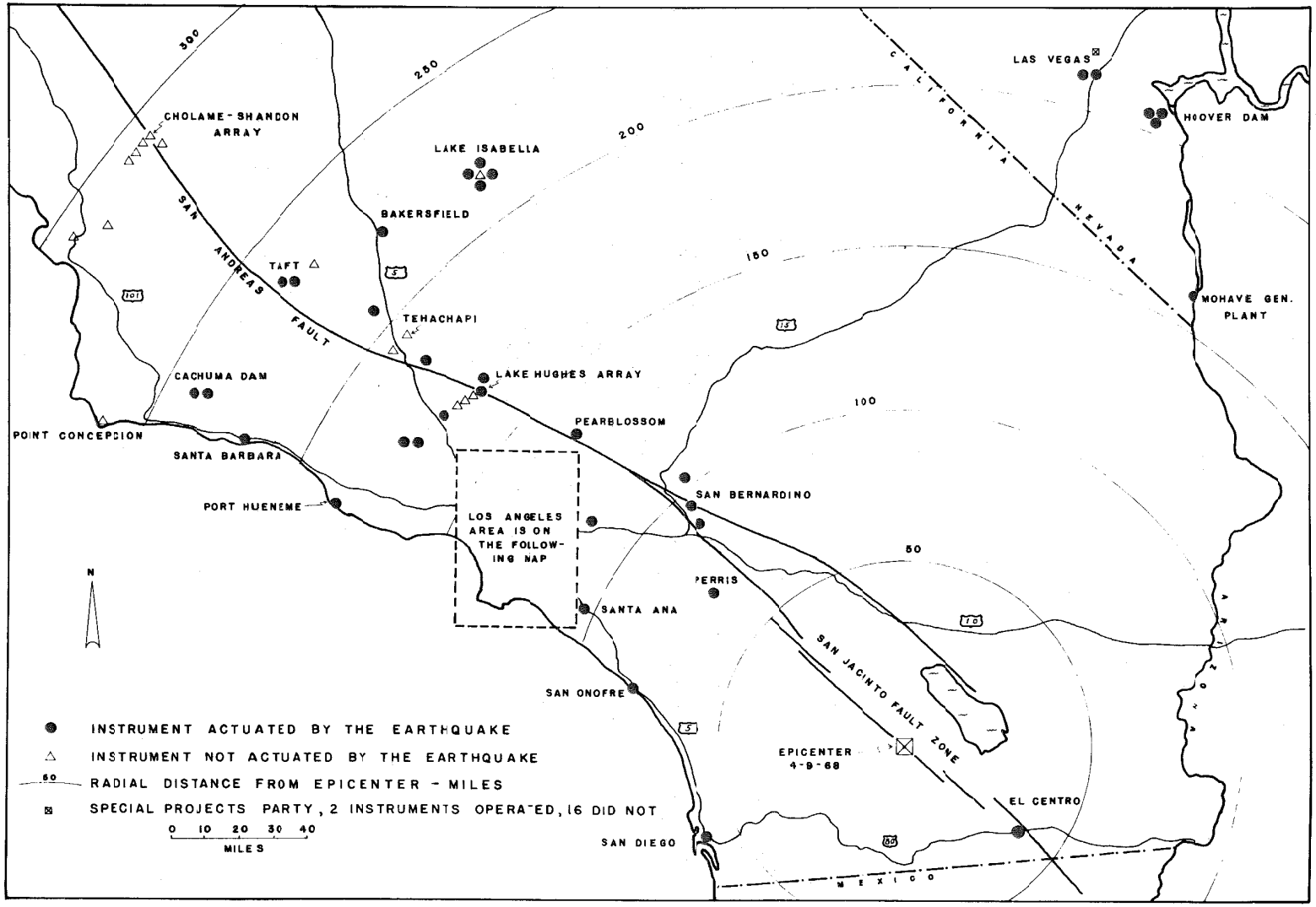
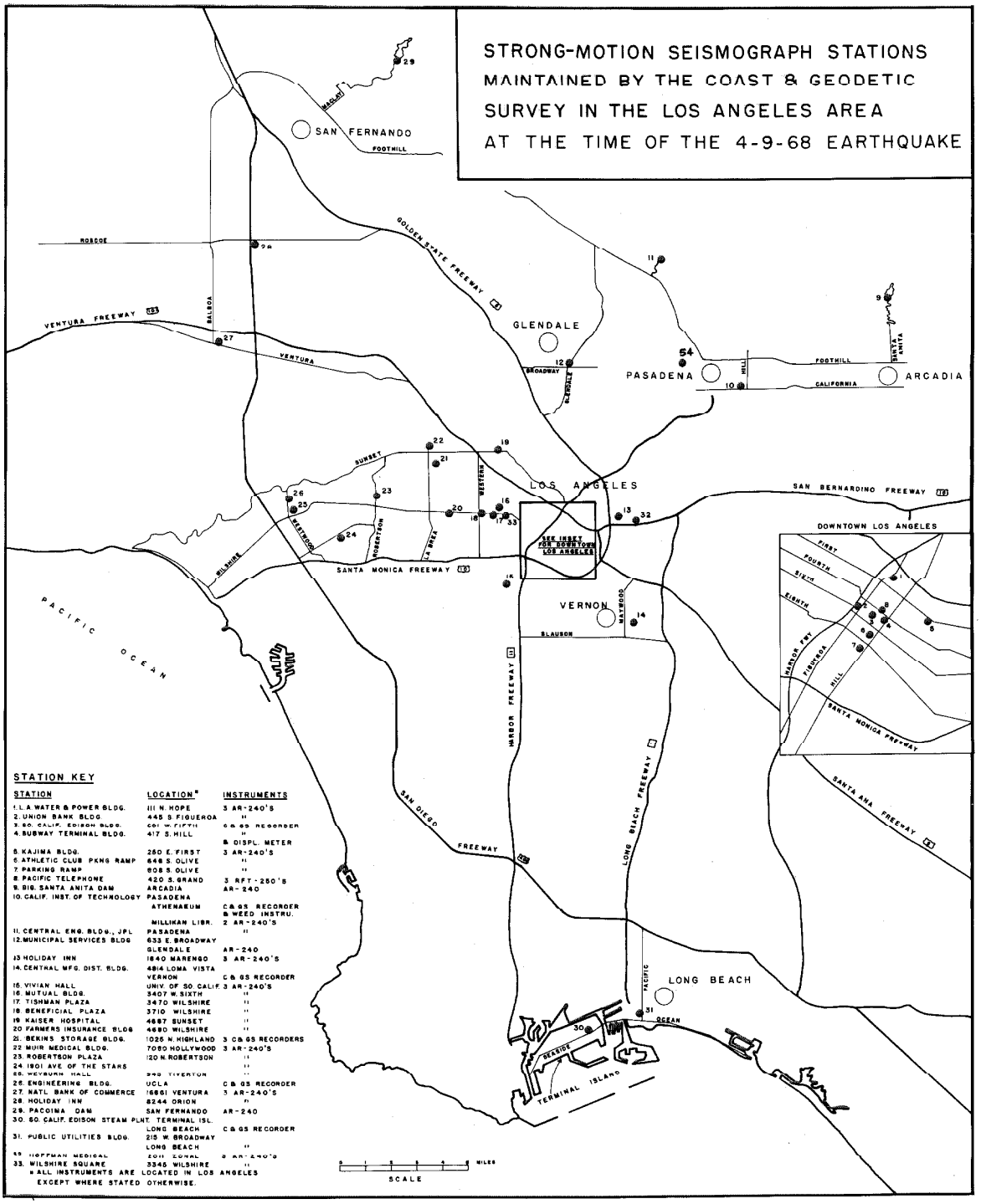


FIGURE 1. SITES OF COAST & GEODETIC SURVEY STRONG-MOTION SEISMOGRAPH STATIONS THAT OPERATED DURING THE EARTHQUAKE OF APRIL 9, 1968.



STATION KEY

STATION	LOCATION*	INSTRUMENTS
1. L.A. WATER & POWER BLDG.	111 N. HOPE	3 AR-240'S
2. UNION BANK BLDG.	445 S. FIGUEROA	"
3. SO. CALIF. EDISON BLDG.	601 W. FIFTH	C & GS RECORDER
4. SUBWAY TERMINAL BLDG.	417 S. HILL	"
		& DISPL. METER
5. KAJIMA BLDG.	250 E. FIRST	3 AR-240'S
6. ATHLETIC CLUB PKNG. RAMP	648 S. OLIVE	"
7. PARKING RAMP	808 S. OLIVE	"
8. PACIFIC TELEPHONE	420 S. GRAND	3 RFT-250'S
9. BIG SANTA ANITA DAM	ARCADIA	AR-240
10. CALIF. INST. OF TECHNOLOGY	PASADENA	
	ATHENAEUM	C & GS RECORDER & WEED INSTRU.
	MILLIKAN LIBR.	2 AR-240'S
11. CENTRAL ENG. BLDG., JPL	PASADENA	"
12. MUNICIPAL SERVICES BLDG.	633 E. BROADWAY	
	GLENDALE	AR-240
13. HOLIDAY INN	1840 MARENGO	3 AR-240'S
14. CENTRAL MFG. DIST. BLDG.	4814 LOMA VISTA	
	VERNON	C & GS RECORDER
15. VIVIAN HALL	UNIV. OF SO. CALIF.	3 AR-240'S
16. MUTUAL BLDG.	3407 W. SIXTH	"
17. TISHMAN PLAZA	3470 WILSHIRE	"
18. BENEFICIAL PLAZA	3710 WILSHIRE	"
19. KAISER HOSPITAL	4867 SUNSET	"
20. FARMERS INSURANCE BLDG.	4680 WILSHIRE	"
21. BEKINS STORAGE BLDG.	1025 N. HIGHLAND	3 C & GS RECORDERS
22. MUIR MEDICAL BLDG.	7080 HOLLYWOOD	3 AR-240'S
23. ROBERTSON PLAZA	120 N. ROBERTSON	"
24. 1901 AVE. OF THE STARS		"
25. WEYBURN HALL	340 TIVERTON	"
26. ENGINEERING BLDG.	UCLA	C & GS RECORDER
27. NATL. BANK OF COMMERCE	16861 VENTURA	3 AR-240'S
28. HOLIDAY INN	8244 ORION	"
29. PACOIMA DAM	SAN FERNANDO	AR-240
30. SO. CALIF. EDISON STEAM PLNT.	TERMINAL ISL.	
	LONG BEACH	C & GS RECORDER
31. PUBLIC UTILITIES BLDG.	215 W. BROADWAY	
	LONG BEACH	"
32. HOFFMAN MEDICAL	2011 ZONAL	3 AR-240'S
33. WILSHIRE SQUARE	3345 WILSHIRE	"

* ALL INSTRUMENTS ARE LOCATED IN LOS ANGELES EXCEPT WHERE STATED OTHERWISE.

FIGURE 2. STRONG-MOTION STATIONS IN LOS ANGELES

Table 1

Records of the Borrego Mountain Earthquake Obtained from the Coast and Geodetic Survey and Affiliated Strong-Motion Seismograph Stations

Station	Instrument Recordings: Stnd. C & GS	AR-240	RFT-250	Displ. Meter	Miles to Epicenter, Nominal
El Centro **	1 *			2	40
San Diego **	1				65
Perris Dam Site		1			75
San Onofre		1			85
Colton **	1			2	90
San Bernardino			1		90
Devil's Canyon		1			95
Santa Ana **	1 *				100
Cedar Springs Dam Site		1			105
Puddingstone Dam		1			115
Long Beach:					
Terminal Island	1				125
215 W. Broadway**	1 *				125
Pasadena:					
Jet Propulsion Lab.		2			130
CIT-Millikan Libr.		1			130
CIT-Athenaeum **	1				130
Seismological Lab.			1		130
Glendale		1			130
Santa Anita Dam		1			130
Los Angeles:					
111 N. Hope		3			135
445 S. Figueroa		3			135
601 W. Fifth **	1				135
417 S. Hill **	1			2	135
250 E. First		3			135
646 S. Olive		3			135
808 S. Olive		3			135
420 S. Grand			3		135
1640 Marengo		3			135
2011 Zonal		3			135
4814 Loma Vista**	1				135
3663 S. Hoover		3			135
Pearblossom		1			135

(Los Angeles cont. on Page 11)

Records of the Borrego Mountain Earthquake - Cont.

Instrument Recordings

Station	Stnd. C & GS	AR-240	RFT-250	Displ. Meter	Miles to Epicenter, Nominal
Los Angeles:					
3407 W. Sixth		3			140
3345 Wilshire		3			140
3470 Wilshire		3			140
3710 Wilshire		3			140
4680 Wilshire		3			140
4867 Sunset		3			140
1025 Highland	3				140
7080 Hollywood Blvd.		3			140
120 N. Robertson		3			145
1901 Ave. of Stars		3			145
945 Tiverton		2			145
UCLA	1 *				145
16661 Ventura		3			145
8244 Orion		3			145
Pacoima Dam		1			145
Castaic Dam Site		1			150
Mohave Gen. Plant			1		160
Fairmont	1 *				165
Lake Hughes No. 1		1			165
Santa Felicia Dam		2			170
Port Hueneme	1 *				185
Oso Pumping Plant		1			190
Wheeler Ridge		1			200
Lake Isabella			4#		210
Hoover Dam	3 *				210
Santa Barbara **	1				215
Las Vegas **	2 *##				215
Bakersfield **	1			2	220
Taft **		2			225
Cachuma Dam **	2 *				235
TOTALS	25	79	10	8	

* Accelerographs equipped with Carder displacement meters.
\# Five instruments are installed without simultaneous connections. Four were actuated by the earthquake, one was not.
\## Special Projects Party, Coast and Geodetic Survey. Two instruments operated, sixteen did not.
** Accelerographs owned by Coast and Geodetic Survey. Others are privately owned but are installed and serviced by the C & GS.

The only operating failure to occur was at the Millikan Library site, California Institute of Technology, Pasadena, where the upper level instrument triggered but failed to take up the paper properly. There were no operations beyond the 235 mile epicentral radius with the nearest following instrument at Point Concepcion, approximately 265 miles distant.

It is interesting to note the closest non-actuated instruments, as listed in Table 2, were part of the Lake Hughes array located 165 miles from the epicenter. Although the Lake Hughes number 1 station a few hundred feet northeast of the fault was triggered, three other instruments located 3 to 9 miles southwest of the San Andreas fault were not. All non-operating accelerographs' stations are located more than 45 miles inland whereas within 30 miles of the coastline every instrument to the 235 mile operable limit was actuated. This variation may be related to the regional patterns of geologic structure introduced by the transcending San Andreas Fault system and the existence of various tectonic provinces.

Records were obtained from 3 different types of acceleration recorders as listed in Table 1; (1) The Standard Coast and Geodetic Survey strong-motion seismograph, 25 records, 13 with Carder displacement meters, (2) Teledyne's model AR-240 strong-motion recorder, 79 records, and (3) Teledyne's model RFT-250 strong-motion recorder, a modified version of the AR-240 that records photographically on 70 mm film, 10 records. Records were also retrieved from the Coast Survey displacement meters located at Los Angeles, Colton, El Centro, and Bakersfield and from Weed seismographs at Pasadena and San Bernardino.

Table 2

Instruments That Were Not Actuated by the Earthquake

Those Within Potential Operable Range		
Station	Instruments	Nominal Miles to Epicenter
Lake Hughes 4, 9, & 12	3 AR-240	165
Fort Tejon	1 AR-240	190
Tehachapi	1 AR-240	195
Lake Isabella	1 RFT-250*	210
Las Vegas	16 Stnd. C&GS#	215
Buena Vista	1 AR-240	225
TOTAL	23	

* One of five was not actuated.
\# Special Projects Party. Sixteen of eighteen were not actuated.

Nearest Instruments Beyond General Range of Operation		
Station	Instruments	Nominal Miles to Epicenter
Point Concepcion	1 AR-240	265
Terminus Dam	3 RFT-250	270
Temblor	1 AR-240	285
Salinas Dam	1 AR-240	285
San Luis Obispo	1 Stnd. C & GS	290
Cholame-Shandon Array	4 AR-240	290
TOTAL	11	

A breakdown of instrument locations according to "structure-type" sites is shown in Table 3. Twenty of the larger building installations have 3 simultaneously connected accelerographs; nineteen of these operated under the Los Angeles building code provision that requires three accelerographs in new buildings larger than 6 stories. Three other buildings have 2 instruments per structure. The remaining single instruments in the taller buildings are located in the lowest level excepting the two in Las Vegas that are installed on the roof or penthouse. Stations in the medium sized buildings are exclusively those operated in the older Coast Survey network outside of Los Angeles with the exception of the UCLA and Glendale sites. Installations in small buildings or sheds are primarily related to facilities other than dams in the California Department of Water Resources Feather River project. The 15 records obtained at existing dams are from 8 different structures where the instruments have been installed in various configurations of from 1 to 5 accelerographs per location. The remaining 3 stations are at future Feather River dam sites.

Discussion

For the first time in the history of strong-motion seismology a very large number of instruments in California were actuated by a single event, an eventuality that could possible become routine for even moderate sized earthquakes provided they occurred near an appropriate concentration of accelerographs. At present there are 120 strong-motion seismographs installed south of the general Bakersfield area.

Table 3

Location of Instruments Actuated by the
Borrego Mountain Earthquake in Relation
to the Existence of a Particular Type Structure

Location	Number of Instruments
Upper level of buildings greater than 6 stories	25
Middle " " " " " " "	21
Lowest " " " " " " "	28
Lowest level of building less than 6 stories but larger than a simple one story structure	13
Small one-story building or shed only	9
At existing dams	15
At future dam sites	3
Total	114

At the current rate of increase, approximately 50 instruments per year, it is quite apparent that future shocks on or near the San Andreas Fault system of equivalent or greater magnitude than the Borrego Mountain earthquake will trigger a considerable portion of the network; in any event probably more than 100 instruments. Should a large earthquake occur near Los Angeles, hub of the prominent increase in instrumentation, the number of individual records could easily reach several hundred if a sequence of significant foreshocks and aftershocks accompanied the primary event.

Historic records of earthquakes in southern California, located in Figure 3, show there have been 16 main shocks greater than magnitude 6.0 during the last 53 years, therefore if one were to form a gross extrapolation based on this rather short time interval, an earthquake of magnitude 6.0 or greater may be expected on an average of every 4 years. Should one select a particular area such as the broadly defined San Jacinto fault zone extending 150 miles from San Bernardino to El Centro where 8 earthquakes of this magnitude range have been observed since 1915, then the nominal occurrence of one of these larger shocks may be suggested for approximately every 7 to 8 years. An examination of Figure 1 and Table 1 shows that only 7 of 114 records were obtained closer than 100 miles from the epicenter. With the past history of significant earthquake activity in southern California it is apparent that if knowledge of strong accelerations per se is desirable then a wider geographic distribution of instrument sites would be advantageous, particularly in relation to the San Jacinto fault zone. Although many other criteria must be considered in locating the instruments such as present or tentative existence of important structures, it

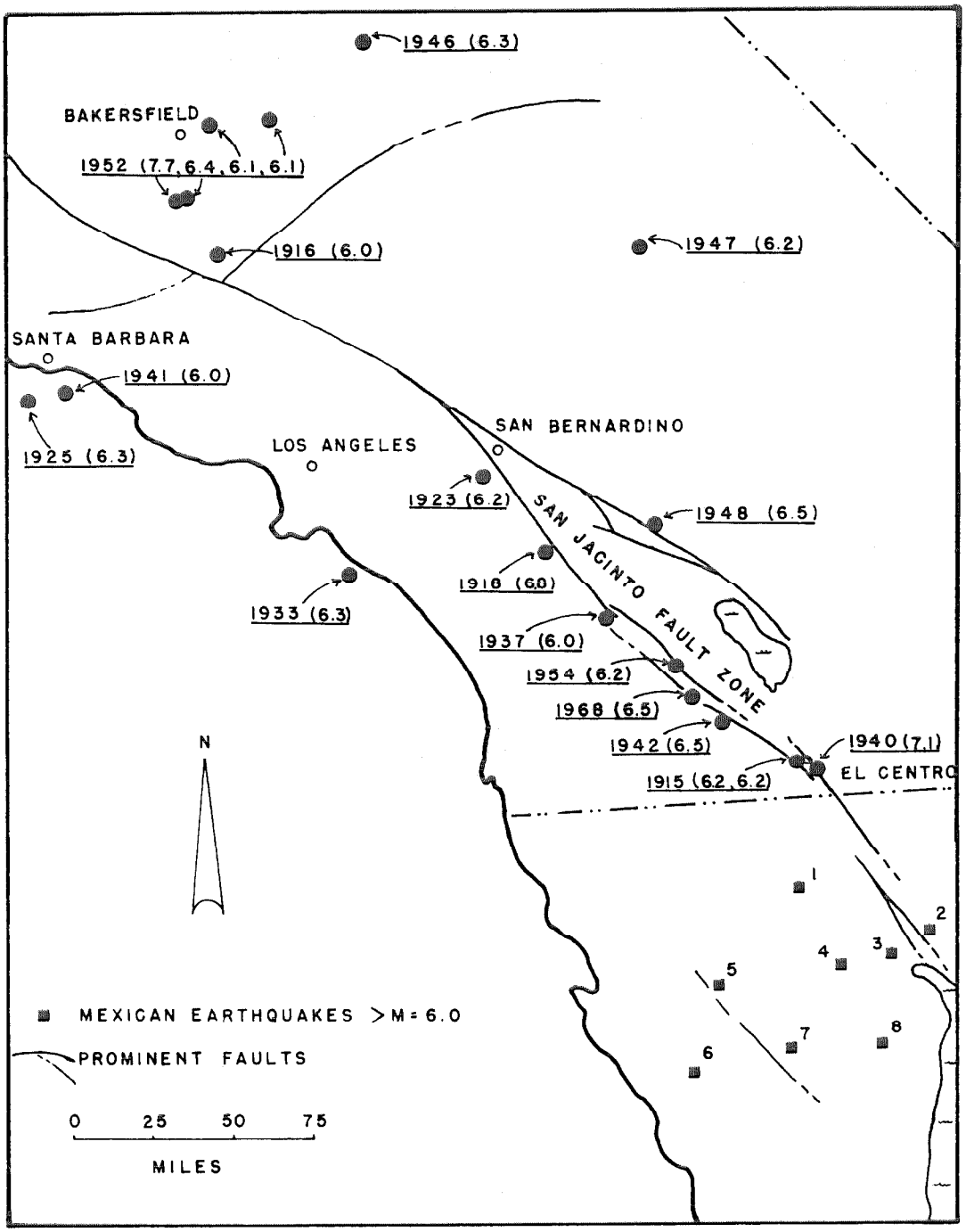


FIGURE 3. Earthquakes of Magnitude 6.0 and greater in southern California region, 1915 - 1963 (from Allen et al, 1965)

would be well to consider the geographic location of historic earthquakes to obtain records useful in investigating attenuation of strong motion, site amplification factors, and regional effects of geologic structure.

Field Reports and Isoseismal Map

by

William K. Cloud and Nina H. Scott
Seismological Field Survey

The following expands the information given in the paper:

> Cloud, William K., and Scott, Nina H., "The Borrego Mountain, California, Earthquake of 9 April 1968: A Preliminary Engineering Seismology Report", Bull. Seis. Soc. Amer., vol. 58, no. 3, June 1968.

A review of reports from an extensive questionnaire canvas by the Coast and Geodetic Survey indicates that the generally felt area of the Borrego Mountain earthquake in the United States was approximately 60,000 square miles. Limits of the generally felt area were from Santa Barbara, northeast to Tehachapi, China Lake, Trona, and Tecopa; in Arizona, southeast to Wikieup, and south to Wenden, Horn, and Dateland. Outside the generally felt area the shock was reported felt slightly at Santa Maria, Fresno, Yosemite Valley, and at Las Vegas. Tentatively, maximum intensity of VII is assigned to a small area of the Anza-Borrego Desert State Park, principally at Ocotillo Wells and vicinity.

Within the intensity VII area, minor right-lateral displacement on the Coyote Fault was observed and Highway 78 was cracked adjacent to Ocotillo Wells. Park rangers reported: "Rockslides in Palm Canyon, Split Mountain, and Font's Point". Huge boulders blocked the

Montezuma-Borrego Highway, beginning at the head of Culp Canyon (about 3 miles southwest of Borrego Springs) and extending toward Borrego Springs to near the Sheriff's Office. Press reports relating to effects at Ocotillo Wells stated that at the Walter Morton home walls split over doorways and at room corners; bedroom separated from the rest of the house; dishes and glassware flew out of cupboards; and 3,600 gallons of water gushed out of a storage tank. At the Ironwoods Motel, about 3 miles west of Ocotillo Wells, the manager reported loud earth noises; tile block cracked; water pipes in building broke; water from swimming pool flooded the motel; ground waves moving toward the north. The manager also reported feeling a light tremor about 45 seconds before the main shock. At the M. A. Smith residence, across Highway 78 from the Ironwoods Motel, a school bus moved 3 inches; furniture moved 4 inches; and the pumice-block building was slightly damaged. At the Borrego Air Ranch, about 10 miles northwest of Ocotillo Wells and west of Borrego Mountain, well water became dark; a pipeline cracked; swimming pool lost 1-1/2 feet of water; but there was no damage to the concrete-block and steel Class "A" building. At the San Felipe Substation, about 3.2 miles south-southeast of Ocotillo Wells, large transformers were shifted, shearing anchor bolts and breaking X-bracing. See Plate 3.

Reported effects of the earthquake at sample locations outside of the intensity VII area were:

Brea (Orange County). Canned goods fell from shelves. Hanging objects swung violently northwest-southeast.

Chula Vista (San Diego County). Strong rolling motion. Power out in 4-square-mile area. Many grocery shelves emptied.

Desert Center (5 miles northeast of; eastern Riverside County). "Waves 6 inches high on swimming pool and about 100 gallons of water splashed out on northwest-southeast sides. Movement of earth was a slow roll and lasted about 30 seconds."

Hemet (Riverside County). "Impossible to walk in trailer during shock. Trailer movement was violent. Water in swimming pool was sloshing over the sides 10 minutes after the shock was apparently over."

Coachella (Riverside County). "Most damage was to grocery and liquor store stocks in this area; a great deal of breakage."

Imperial County:

Power disruptions occurred in some sections of Imperial Valley.

Brawley (8 miles west of; Wieman Ranch). "I have experienced all shocks here in the last 45 years. This one was the most violent of all but its vibrations were mostly vertical and therefore it did not topple bookcases, china closets, etc., as in previous shocks. Damage was negligible."

Calexico. (Press) A portion of the ceiling fell in Safeway store.

El Centro. (Press) Part of a ceiling fell at the J. C. Penny store in Valley Plaza. The Balboa Hotel, which was battered by the 1940 earthquake, was damaged again. Plaster fell from walls and ceilings on the hotel's second floor. Merchandise fell in stores.

Imperial. Damage at Imperial was reported as generally light. About 7,500 books fell from shelves at the public library. About 6 miles west of Imperial on the Worthington Road grade leading down to New River, there was a crack in the road about 200 feet long and 2 inches wide. "Shock lasted nearly a minute. Sensation of standing in small boat in choppy water. Walking would have been difficult. Feeling of nausea persisted for 15 - 20 minutes following the shock. Lights were off for 10 - 15 minutes after the shock."

Westmorland. (Press) Top portion of brick wall collapsed at a laundromat. Walls cracked in other buildings.

Long Beach (Los Angeles County). Press reported the passenger liner Queen Mary, in drydock at the Long Beach Naval Shipyard, rocked back and forth on its keel blocks for 5 minutes following the shock. Few windows cracked. People ran outdoors at the U. S. Naval Base.

Los Angeles. (Press) Los Angeles area residents reported instances of chairs sliding across floors, cracks in plaster, and water sloshing out of swimming pools. The following report was received from a structural engineer: "I inspected two downtown buildings on April 16, 1968, for an insurance company. One of the buildings is 13 stories, steel frame, brick filler walls. Both are of about the same construction, and were constructed prior to any earthquake code design criteria. Interior partitions are mostly plastered hollow tile. Damage in both buildings was limited almost entirely to plaster cracks where old cracks from the 1933 and 1952 earthquakes were reopened or were slightly enlarged. There was a slight "banging" crumbling where one building is built tight against the other to the north."

Palm Springs (Riverside County). "Light fixture swayed violently 2 or more feet in north-south direction. Dinner guests became partially ill. Neighbors ran outside, some screaming."

Salton Sea. (Press) Residents on the north shore of the Salton Sea reported a 6-inch tide was measured on concrete retaining wall.

San Diego (San Diego County). Press reported hundreds of broken windows and severed power lines in beach communities of San Diego County. In the south San Diego Bay area, high tension wires swung and arced over. People seated found it difficult to stand erect.

West Covina (Los Angeles County). Strong rolling northwest-southeast motion, lasted 1 minute. Difficult to walk.

Whittier (Los Angeles County). "Water splashed out of pool and ran into northeast drains, uphill, and back onto deck from northwest drains. Moved filter off of underground filter in northeast direction. Ground visibly wavy."

Cantil (eastern Kern County). Felt by all. Vehicles rocked.

Fillmore (Ventura County). "Water in swimming pools splashed by rocking motion."

Fort Irwin (about 25 miles northeast of Barstow; San Bernardino County). Dizzy sensation experienced.

Blythe (Lost Lake Resort, about 31.5 miles north of Blythe, Colorado River area of Eastern Riverside County). "I was sitting on couch in trailer. The trailer shook violently for a few seconds. The effects were very noticeable."

Coso Junction (southern Inyo County). "I was leaning on desk and thought I was having a dizzy spell. Also felt nauseated."

Tecopa (southeast Inyo County). Telephone poles and lines shook.

Arizona:

Horn (about 150 miles east of the epicenter and just north of Dateland). "One 1,800-foot well pumped red clay. Production of the well dropped off 900 gallons per minute. Desk shifted 1 inch."

Yuma. "Reports of very few cracks in concrete walks and driveways. Noticeable movement of parked vehicles. Water splashed out of pools."

Quartzsite. Water disturbed.

Topock. Small objects and furniture shifted.

Wenden. All persons in home felt a sensation of seasickness.

Figure 4 shows the preliminary isoseismal map which has been prepared for the earthquake. The following photographs were taken by B. J. Morrill of the Seismological Field Survey.

Plate 1

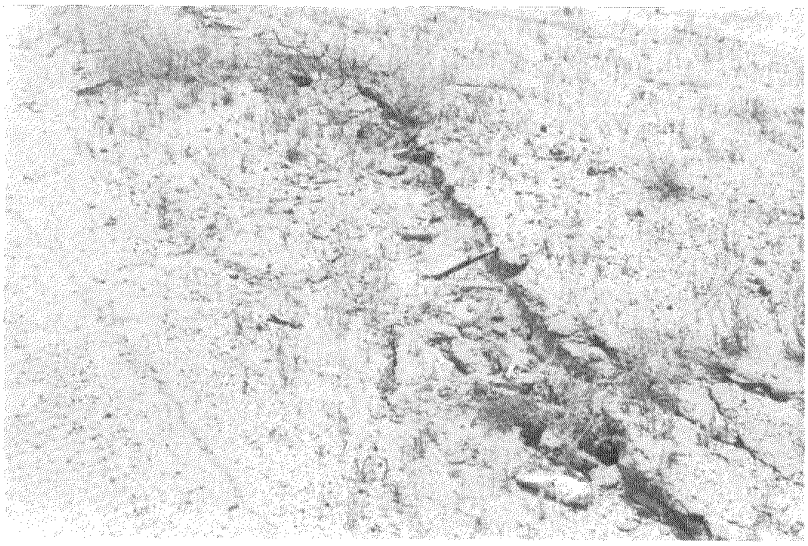


Plate 2

Views of ground cracks along northeast side of Borrego Mountains.

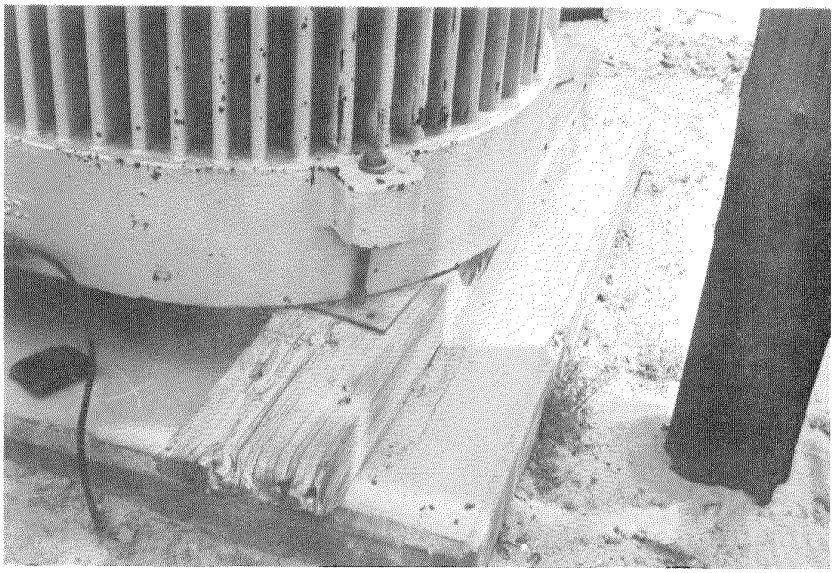


Plate 3

Transformers at the San Felipe Substation moved southwest, shearing some bolts and shifting wood skids.

Plate 4

Floor beams were separated and the concrete porch was cracked at the Desert Ironwoods Resort, Ocotillo Wells.

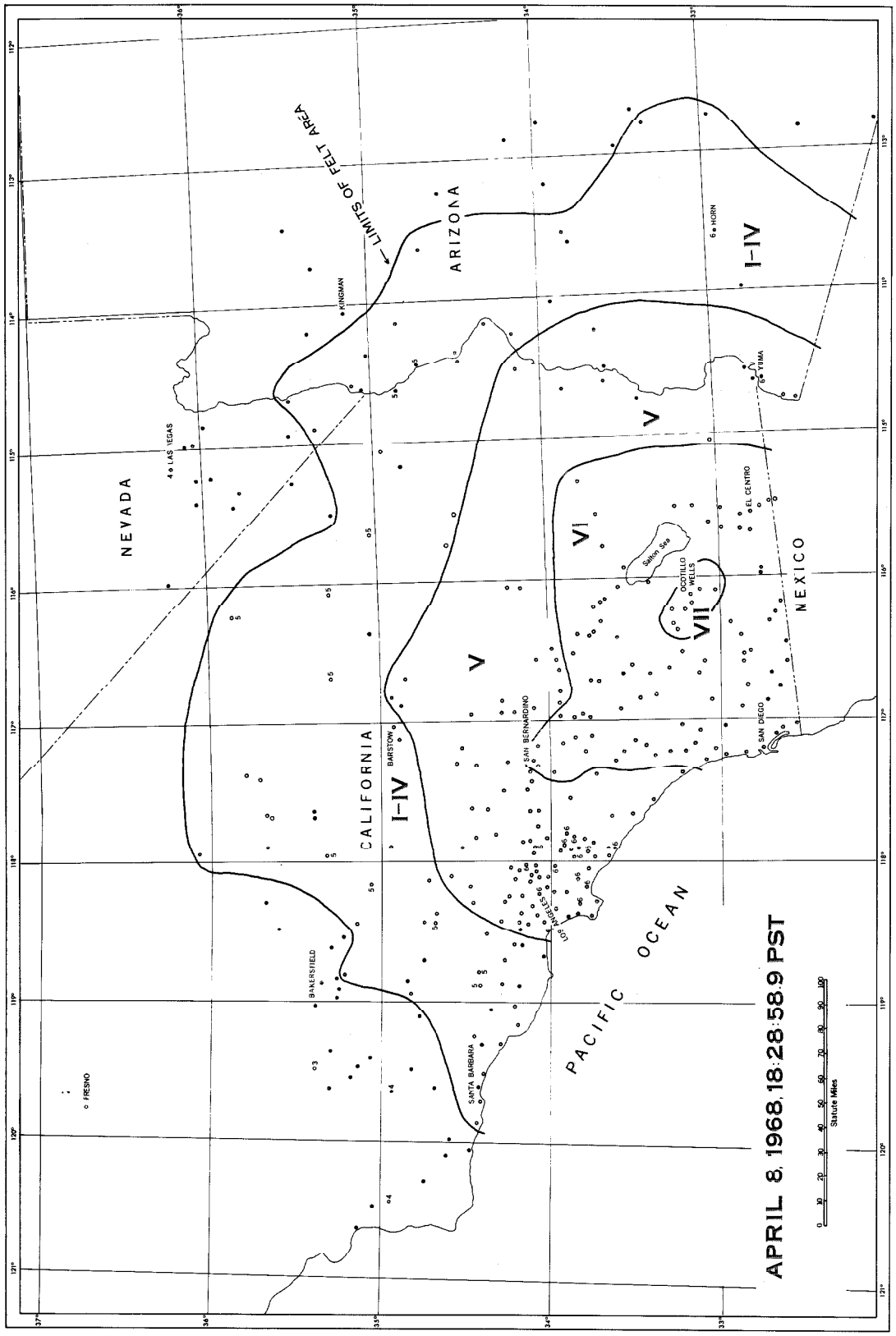


Figure 4. Preliminary Isoseismal Map.

Seismological and Geological Background

The following information is summarized from the paper:

> Allen, C. R., Grantz, A., Brune, J. N., Clark, M. M. Sharp, R. V., Theodore, T. G., Wolfe, E. W., and Wyss, M., "The Borrego Mountain, California, Earthquake of 9 April 1968: A Preliminary Report", Bull. Seis. Soc. Amer., vol. 58, no. 3, June 1968.

The magnitude of the earthquake as tentatively assigned by the Pasadena Seismological Laboratory was 6.5. The epicentral location was 33° 08.8'N, 116° 07.5'W and the focal depth 20 km. Figure 5 shows the pattern of observed surface faulting, and the relationship to known fault systems in the region. Maximum horizontal displacements of 38 cm right-lateral slip were noted, with only minor local vertical fault motions. The width of the zone of fracture varied from 1 meter to several hundred meters, with most of the displacement occurring in narrow zones of from 1 - 20 meters. The fault ruptures followed almost exactly lines of earlier breaks as indicated by existing scarps, etc. Theodolite surveys after the earthquake have shown no evidences of creep following the earthquake.

Fault motions which apparently occurred at about the same time as the earthquake were noted on faults as far as 70 km from the epicenter. The evidence strongly suggests that these fault motions were triggered by the Borrego Mountain earthquake.

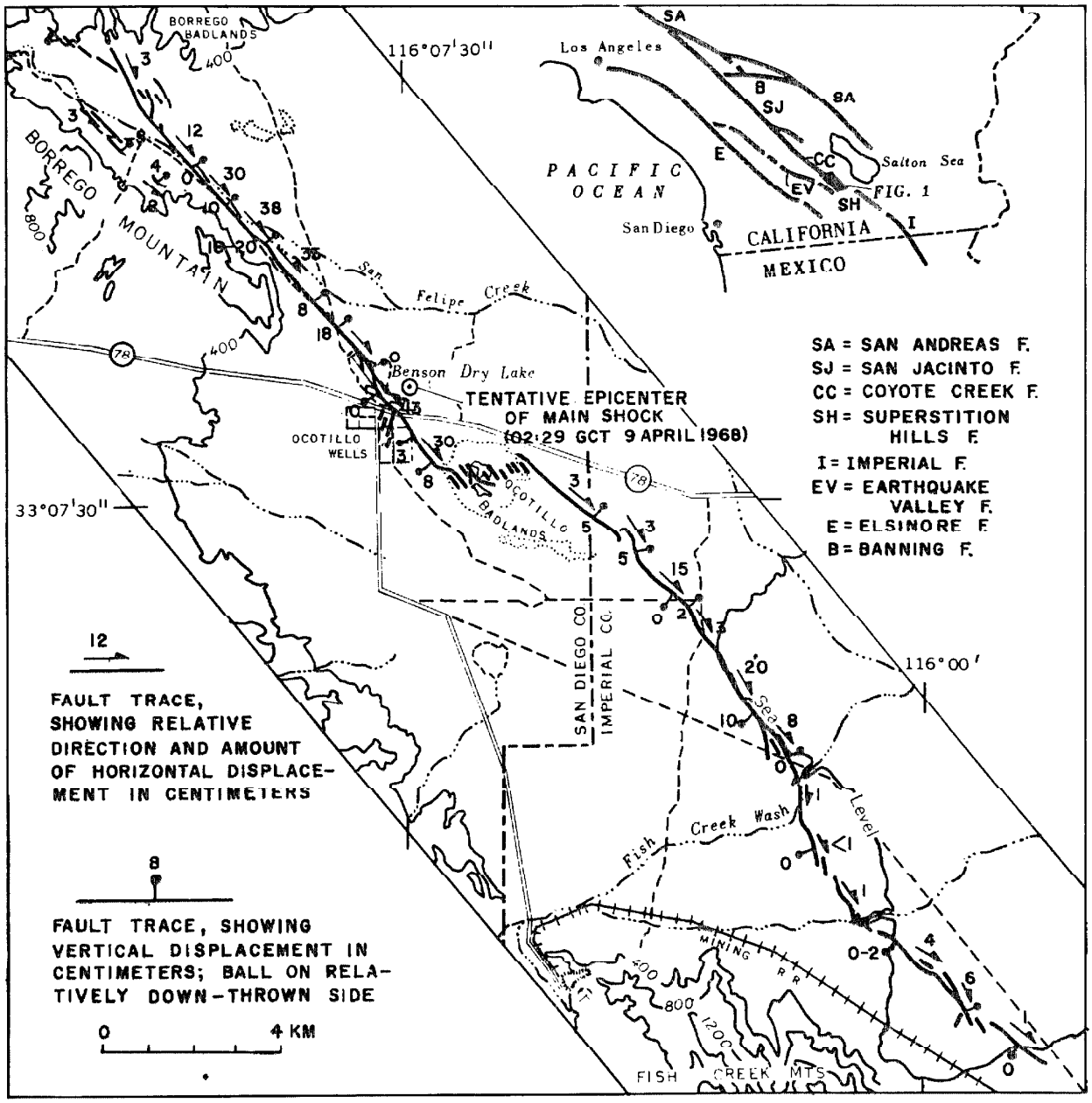


Figure 5. The Borrego Mountain area, southern California, showing the tentative epicenter earthquake of 9 April 1968, and the displacements that accompanied the earthquake along 33 km of the Coyote Creek fault trace.

Seismoscope Results

After the Borrego Mountain earthquake smoked glass plates were removed from all seismoscopes within 230 miles of the epicenter. Except for the El Centro records there is no assurance that traces on the plates were caused by the earthquake. The traces could have been due to minor earthquakes and overlooked during seismoscope inspections made prior to the Borrego Mountain earthquake. Table 4 is included merely to document what was found when the plates were inspected.

Figure 6 shows four seismoscope records from El Centro. Measurements from the record plates and calculations of responses are summarized in Table 5.

Table 4

Double Trace Amplitudes Recorded on Seismoscopes at Distances Greater Than 50 Miles From Epicenter of 9 April 1968 (GMT)

Seismoscope Number	Approximate Distance & Angle From Epicenter		Double Trace Amplitude	Location
	Miles	Degrees	Inches	
249	78	N 52 W	x	Perris (Accel. Sta.)
161	91	S 60 E	.04	San Luis, Ariz. (Customs Sta.)
116	92	N 52 W	.10	Riverside (Lincoln School)
142	93	N 51 W	x	Riverside (CIT Seis. Sta.)
144	93	N 46 W	.13	San Bernardino (Post Office)
143	93	N 47 W	.10	Colton (Accel. Sta.)
107	97	N 43 W	.10	Arrowhead (Forest Sta.)
136	98	S 79 E	.12	Yuma, Ariz. (Imperial Dam)
237	100	N 44 W	x	San Bernardino (Devil's Canyon #6)
241	100	N 44 W	x	San Bernardino (Devil's Canyon #5)
223	101	N 44 W	.12	San Bernardino (Devil's Canyon #3)
232	101	N 44 W	.04	San Bernardino (Devil's Canyon #7)
233	101	N 44 W	x	San Bernardino (Devil's Canyon #1)
227	101	N 44 W	x	San Bernardino (Devil's Canyon #4)
231	101	N 44 W	.03	San Bernardino (Devil's Canyon #2)
2854	104	N 42 W	x	Cedar Springs
2867	104	N 42 W	x	Cedar Springs (Seis. Sta.)
159	109	N 67 W	.05	Santa Ana (Accel. Sta.)
515	115	N 53 W	.04	Thompson Creek (Left Bank)
560	115	N 54 W	.04	Thompson Creek (Crest)
514	116	N 54 W	.03	Live Oak (Left Bank)
524	116	N 54 W	x	Live Oak (Crest)
529	117	N 56 W	.44	Puddingstone Reservoir
509	118	N 54 W	.54?	San Dimas Res. (Left Bank)
531	118	N 54 W	x	San Dimas Res. (Crest)
520	120	N 54 W	x	Big Dalton Res. (Crest)
567	120	N 54 W	x	Big Dalton Res. (Left Bank)
117	123	N 49 W	x	Altadena - Residence
131	124	N 47 W	x	Table Mountain

Seismoscope Number	Approximate Distance & Angle From Epicenter		Double Trace Amplitude	Location
	Miles	Degrees	Inches	
506	124	N 54 W	.24	San Gabriel Reservoir (Crest)
545	124	N 54 W	x	San Gabriel Reservoir (Left Bank)
147	127	N 70 W	.03	Long Beach (Accel. Sta.)
569	129	N 57 W	x	Sawpit Canyon Res. (Crest)
505	129	N 57 W	x	Sawpit Canyon Res. (Left Bank)
149	129	N 71 W	.03	Terminal Island (Accel. Sta.)
115	131	N 60 W	.03	San Marino City Hall
530	131	N 54 W	x	Cogswell Res. (Right Bank)
507	131	N 54 W	x	Cogswell Res. (Crest)
565	131	N 57 W	x	Santa Anita Reservoir
120	132	N 66 W	.05	Huntington Park City Hall
110	132	N 61 W	.04	Los Angeles - Residence
122	132	N 71 W	x	Long Beach - San Pedro H. S.
104	132	N 62 W	.07	East Los Angeles Jr. College
129	133	N 65 W	.06	Los Angeles (Southgate H. S.)
138	133	N 60 W	.04	Pasadena (C. I. T. Acc. Sta.)
163	133	N 70 W	.06	Los Angeles (Compton)
128	134	N 58 W	x	Pasadena (Hale School)
134	134	N 70 W	x	Los Angeles (Narbonne H. S.)
148	134	N 64 W	.14	Los Angeles (Vernon Acc. Sta.)
508	134	N 58 W	.04	Eaton Wash Res.(Base)
517	134	N 58 W	.06	Eaton Wash Res. (Crest)
101	135	N 59 W	x	Pasadena (Star News)
124	136	N 60 W	x	Pasadena (Garfield School)
126	137	N 60 W	x	Pasadena (San Raphael School)
152	137	N 60 W	x	Pasadena (Seismological Lab.)
100	137	N 59 W	x	Pasadena (Washington Jr. H. S.)
108	137	N 59 W	x	Pasadena (Muir H. S.)
133	138	N 58 W	.03	Pasadena (Gilman Res.)
135	138	N 63 W	.04	Los Angeles (Subway Term.)
151	138	N 59 W	x	Pasadena (Moto Res.)
157	138	N 64 W	x	Los Angeles (Museum of Sci.)
566	138	N 59 W	x	Devils Gate Res. (Crest)
568	138	N 59 W	x	Devils Gate Res. (Left Bank)
208	138	N 60 W	x	Eagle Rock Res. (W. Abut.)
209	138	N 60 W	.04	Eagle Rock Res. (Crest)
150	138	N 63 W	.05	Los Angeles (Edison Bldg.)
2847	140	N 48 W	x	Pearblossom
154	141	N 65 W	.04	Los Angeles (Windsor Hills)
155	142	N 61 W	x	Los Angeles (Residence)
141	142	N 60 W	x	Glendale (Herbert Hoover Sch.)
123	142	N 67 W	.06	Los Angeles (Residence)
192	142	N 65 W	.05	Los Angeles (Baldwin Hills)
513	142	N 57 W	.03	Big Tujunga Res. (Left Bank)
528	142	N 57 W	x	Big Tujunga Res. (Crest)

Seismoscope Number	Approximate Distance & Angle From Epicenter		Double Trace Amplitude	Location
	Miles	Degrees	Inches	
146	142	N 63 W	.06	Hollywood (Accel. Sta.)
205	143	N 62 W	x	Hollywood Res. (W. Abut.)
212	143	N 62 W	x	Hollywood Res. (Crest)
140	143	N 64 W	.07	Los Angeles (Hancock Park)
102	143	N 69 W	.06	El Segundo (Hyperian Plant)
127	144	N 66 W	.04	Los Angeles (Playa Del Rey Sch.)
125	145	N 60 W	.04	Burbank (Burbank H. S.)
206	147	N 64 W	x	Franklin Canyon (Crest)
207	147	N 64 W	x	Franklin Canyon (W. Abut.)
162	147	N 61 W	x	Los Angeles (Elysian School)
137	148	N 65 W	x	Los Angeles (UCLA Accel.Sta.)
113	148	N 64 W	.04	Los Angeles (W. L. A. Library)
203	150	N 64 W	x	Stone Canyon (Crest)
204	150	N 64 W	x	Stone Canyon (E. Abut.)
109	151	N 64 W	x	Los Angeles (Duke Res.)
156	152	N 66 W	.04	Los Angeles (Tauxe Res.)
139	152	N 61 W	x	Los Angeles (Van Nuys H. S.)
210	157	N 60 W	.24	San Fernando (Van Norman Crest)
213	157	N 60 W	.04	San Fernando (Van Norman E. Abut.)
201	157	N 56 W	x	Bouquet Canyon (W. Abut.)
202	157	N 56 W	.04	Bouquet Canyon (Crest)
525	158	N 58 W	.10	Pacoima Dam
199	166	N 56 W	x	Encino Res. (Crest)
200	166	N 56 W	x	Encino Res. (W. Abut.)
217	166	N 56 W	x	Encino Res. (Tower)
194	167	N 56 W	.06	Saugus Dry Canyon (E. Abut.)
196	167	N 56 W	.13	Saugus Dry Canyon (Crest)
211	171	N 51 W	x	Fairmount Res. (S. Abut.)
216	171	N 51 W	.04	Fairmount Res. (Crest)
2891	171	N 53 W	x	Lake Hughes No. 4
2887	171	N 52 W	.05	Lake Hughes No. 3
2824	171	N 52 W	x	Lake Hughes No. 2
2819	171	N 54 W	.08?	Lake Hughes No. 11
2889	171	N 52 W	x	Lake Hughes No. 4A
2893	171	N 55 W	x	Lake Hughes No. 12
2894	171	N 53 W	x	Lake Hughes No. 5
2892	171	N 53 W	x	Lake Hughes No. 9
2890	171	N 53 W	x	Lake Hughes No. 8
2888	171	N 53 W	.04	Lake Hughes No. 6
2822	171	N 53 W	x	Lake Hughes No. 7
229	171	N 56 W	.06	Castaic N. Station
222	172	N 56 W	.04	Castaic Gravel Pit
2874	176	N 57 W	.04	Castaic Old Ridge Route
585	177	N 59 W	x	Santa Felicia Dam (Left Abut.)
586	177	N 59 W	x	Santa Felicia Dam (Rt. Abut.)

Seismoscope Number	Approximate Distance & Angle From Epicenter		Double Trace Amplitude	Location
	Miles	Degrees	Inches	
588	177	N 59 W	.03	Santa Felicia Dam (Outlet Works)
589	177	N 59 W	.03	Santa Felicia Dam (Rt. Crest)
587	177	N 59 W	.04	Santa Felicia Dam (Dam Crest)
590	177	N 59 W	x	Santa Felicia Dam (Toe)
2851	200	N 51 W	.14	Grapevine (Tehachapi P. P.)
2954	200	N 51 W	x	Grapevine (Tehachapi P. P.)
2955	210	N 52 W	x	Wheeler Ridge (Accel. Sta.)
2897	210	N 52 W	x	Wheeler Ridge (Pump. Plant)
2849	210	N 52 W	x	Wheeler Ridge (Tiltmeter)
260	229	N 53 W	x	Taft (Buena Vista Accel. Sta.)
235	229	N 53 W	x	Taft (Buena Vista S.)
228	229	N 53 W	x	Taft (Buena Vista N)

x represents from .02" double trace amplitude to no trace motion.

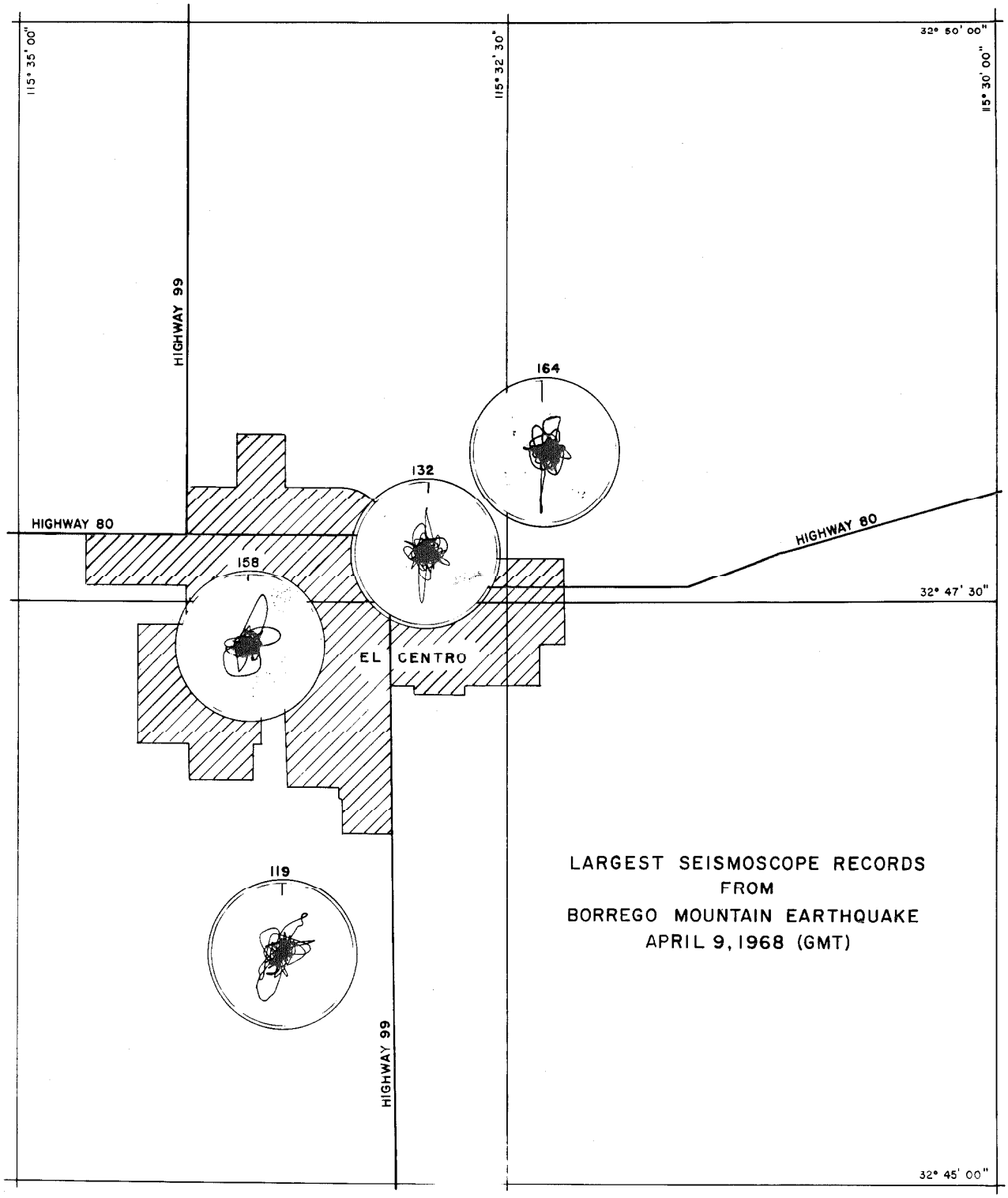


Figure 6. El Centro Seismoscope Records.

Table 5

Relative Maximum Displacement of Seismoscopes in El Centro, California, During the Borrego Mountain Earthquake of 9 April 1968 (GMT)

Location	Seismoscope Number	Period = T Seconds	Damping = n % Critical	Sensitivity = S Inches/radian	Maximum Trace Amp. = A_t Inches	Rel. Disp. = S_d Inches	Approximate Distance and Angle From Earthquake Epicenter	
							Miles	Degrees
Central Union High School	158	.75	9	2.16	.33	.80	40.3	S52.8E
Electric Substation (Accelerograph Station)	132	.73	9	2.14	.33	.72	41.3	S54.1E
Electric Power Plant	164	.75	8	2.14	.41	.95	41.5	S55.1E
Water Works	119	.74	9	2.19	.31	.70	42.0	S51.3E

Note: $S_d = \frac{gT^2}{4\pi^2} \varphi \sqrt{\frac{n}{10}}$ where $\varphi = \frac{A_t}{S}$

Accelerograph Records

Table 6 summarizes the instrumental characteristics and main results for the strong-motion accelerographs actuated by the earthquake. Column headings are described below:

1. Record number.
2. Location of accelerograph in multi-storied buildings.
3. Direction of pendulum motion for individual instrument.
4. Instrument number.
5. Period in seconds.
6. Damping ratio, ϵ, the ratio between the amplitudes of a given wave crest and the crest (in the opposite direction) a half cycle later. This ratio is related to the fraction of critical damping, n, by the expression

$$\epsilon = \exp\left[\pi n/\sqrt{(1-n^2)}\right]$$

This relationship leads to the following list of equivalent dampings:

Damping Ratio, ϵ	Fraction of Critical Damping, n
6	0.495
7	0.528
8	0.552
9	0.574
10	0.592
11	0.607
12	0.621
13	0.632

7. For accelerometers, sensitivity in cm/g for the original trace. For displacement meters, magnification.

8, 9. The periods and amplitudes of maximum acceleration (for accelerometers, in sec and cm/sec^2) or displacement (for displacement meters, in sec and cm). These figures were determined according to standard procedures used for the publication United States Earthquakes, issued annually by the U. S. Coast and Geodetic Survey. The values are approximate, based on a visual inspection of the record assuming sinusoidal wave shapes.

10. Nominal distance of the station from the epicenter in miles.

The data on each station is introduced by its identifying number (appearing also in Fig. 2), and the location of the station. Ordering of the stations follows that in Fig. 2 for the Los Angeles stations, and thereafter, approximately, with distance from the epicenter.

The following notes on the photographic reproductions of the accelerograms will help to clarify various details:

The identifying typed number of every trace appears in the top left corner and corresponds to the number in Table 6 Many of the records have continuations on the same, or next page. These continuations are labelled with their identifying typed number in the top left corner, the same as for the first section. Overlapping portions of a record were generally kept to one-half inch, measured on the original record. Generally, the overlap indicating marks, and the temporary marking off on the original records, can still be seen at each end of every record section.

Those records from buildings with two or three instruments had simultaneous starts, but are not necessarily lined

up exactly. Individual trace starts can often be found, though, near the title. Some traces show one or more breaks – the time duration of such breaks is unknown.

The following details are also noted:

Record 7 : The address of the instrument location is both 808 S. Olive and 808 S. Hill.

Record 10a: The Pasadena Faculty Club is C. I. T. 's Athenaeum.

Record 19 : The address is 4867 Sunset, not 4687.

Record 39 : The station location is the Hall of Records, San Bernardino.

Record 52 : The instrument location is on the roof of the First National Bank, Las Vegas.

Records 7c, 12, 15a, 17a, 19b, 26, 27b, 42, 43, 44, 48a, and 53a contain incorrect numerical data and are corrected in Table 6. In the interests of saving space, the following records appear out of numerical order: 14 and 31 appear after 1; 9, 12 and 29 after 58; 43 after 38; and 44 after 42.

Table 6

Strong-Motion Seismograph Results

1	2	3	4	5	6	7	8	9	10
							Maximum		Distance
Record Number	Floor or Location	Direction	Instrument Number	Period (sec)	Damping Ratio, ϵ	Sensitivity (cm/g) or Magnification	Period (sec)	Amplitude (cm/sec^2 or cm)	from Epicenter (miles)
1. Los Angeles —Water & Power Building.									138
1a	15th	N 50 W	285	.052	9	7.5	.22	6	
							2.58	16	
		down	290	.052	8	7.4	.21	7	
		S 40 W	310	.052	9	7.5	2.36	38	
1b	7th	N 50 W	242	.058	6	7.9	.27	9	
							.77	12	
		down	233	.057	9	719	.22	5	
		S 40 W	316	.052	11	7.8	.35	7	
							2.7	16	
1c	Bsmt	N 50 W	323	.052	11	7.7	.61	2	
		down	346	.053	11	7.5	.61	4	
		S 40 W	288	.053	10	7.3	.37	3	
2. Los Angeles, 445 Figueroa – Union Bank									138
2a	39th	N 38 E	507	.0528	11	7.6	.7	13	
		down	505	.0534	11	7.6	.27	13	
		N 52 W	438	.0526	9.5	7.6	1.75	35	
2b	19th	N 52 W	403	.0554	9.5	7.6	.25	8	
							1.15	22	
		down	502	.0554	10	7.6	.3	6	
		S 38 E	433	.0565	9.5	7.6	.2	6	
							1.1	9	

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1	2	3	4	5	6	7	8	9	10
							Maximum		Distance
Record Number	Floor or Location	Direction	Instrument Number	Period (sec)	Damping Ratio, ε	Sensitivity (cm/g) or Magnification	Period (sec)	Amplitude (cm/sec^2 or cm)	from Epicenter (miles)
2. Los Angeles, 445 Figueroa — Union Bank (cont.)									138
2c	Bsmt	N 52 W	444	.0561	12.5	7.6	.26	5	
							1.13	6	
		down	460	.0522	9.5	7.6	not measurable		
		S 38 E	417	.0559	9.5	7.6	.19	4	
							.34	5	
3. Los Angeles, Edison Building									138
		up	268	.065	9	12.9	.52	3	
		S 38 W	269	.066	9	13.2	1.30	10	
		N 52 W	270	.066	9	13.0	.87	6	
4. Los Angeles Subway Terminal									138
4a	Bsmt	up	211	.066	8	12.7	.70	5	
		S 52 E	210	.064	8	12.1	.35	6	
		S 38 W	209	.066	8	12.9	.70	5	
							1.70	8	
4b	Bsmt	S 52 E	LDM	9.85	10	1	2.7	.78	
							1.0	.15	
							4.8	1.63	
4c	Bsmt	N 38 E	RDM	10.10	10	1	1.4	.15	
5. Los Angeles, 250 E. First Street									136
5a	17th	N 36 E	189	.047	9	7.6	1.90	42	
							.60	11	
		down	224	.047	11	7.6	.23	9	
		N 54 W	215	.047	9	7.6	.88	20	
							1.64	20	

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1	2	3	4	5	6	7	8	9	10
							Maximum		
Record Number	Floor or Location	Direction	Instrument Number	Period (sec)	Damping Ratio, ε	Sensitivity (cm/g) or Magnification	Period (sec)	Amplitude (cm/sec^2 or cm)	Distance from Epicenter (miles)
5. Los Angeles, 250 E. First Street (cont.)									136
5b	8th	N 36 E	233	.049	10	7.6	1.38	13	
		down	202	.048	9	7.6	.22	3	
		N 54 W	205	.049	9	7.6	.88	19	
5c	Bsmt	N 36 E	205	.049	11	7.6	1.40	10	
		down	207	.048	10	7.6	.62	2	
		N 54 W	241	.049	9	7.6	1.11	8	
6. Los Angeles, 646 Olive Street									137
6a	Roof	S 37 W	126	.049	9	7.6	.44	17	
		down	127	.049	9	7.6	.10	2	
		S 53 E	174	.049	8	7.6	.26	19	
6b	4th	S 37 W	129	.046	10	7.6	.42	12	
		down	130	.048	9	7.6	.25	3	
		S 53 E	128	.050	9	7.6	.23	12	
6c	Bsmt	S 37 W	132	.047	9	7.6	.55	1	
		down	133	.045	9	7.6	.99	8	
		S 53 E	131	.046	10	7.6	.33	5	
7. Los Angeles, 808 S. Hill Street									137
7a	7th	N 37 E	403	.054	8	7.6	.25	13	
		down	457	.059	9	7.6	.42	6	
		N 53 W	410	.056	8	7.6	.23	11	
7b	4th	S 49 E	L	.052	9	7.6	.80	7	
		down	V	.055	10	7.6	.46	6	
		N 41 E	T	.055	9	7.6	.45	10	

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1	2	3	4	5	6	7	8	9	10
							Maximum		
Record Number	Floor or Location	Direction	Instrument Number	Period (sec)	Damping Ratio, ϵ	Sensitivity (cm/g) or Magnification	Period (sec)	Amplitude (cm/sec^2 or cm)	Distance from Epicenter (miles)
7. Los Angeles, 808 S. Hill Street (cont.)									137
7c	Street	N 37 E	429	.054	9	7.6	2.17	11	
		down	455	.055	10	7.6	.57	3	
		N 53 W	466	.054	9	7.6	1.00	7	
8. Los Angeles, 420 S. Grand									140
8a	17th		L	.047	13.2	1.9	.7	16	
			V	.048	10.5	1.9	not measurable		
			T	.047	10.5	1.9	.8	39	
8b	10th		L	.046	11.1	1.9	.85	16	
			V	.046	10.1	1.9	not measurable		
			T	.047	8.8	1.9	.85	26	
8c	2nd		L	.045	8.0	1.9	not measurable		
			V	.046	10.3	1.9	not measurable		
			T	.046	9.3	1.9	not measurable		
9. Santa Anita Dam									131
		down	297	.052	9.9	7.6	.1	1	
		N 03 E	389	.051	8.3	7.6	.2	3	
		N 87 W	266	.051	9.1	7.6	.15	4	
10. Pasadena, Caltech Faculty Club and Millikan Basement									133
10a		up	325	.081	9	20	.5	3	
							1.0	3	
		South	326	.078	9	18	.55	5	
							.75	6	
		West	327	.079	8	19	1.4	3	
							1.55	8	

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1	2	3	4	5	6	7	8	9	10
							Maximum		Distance
Record Number	Floor or Location	Direction	Instrument Number	Period (sec)	Damping Ratio, ε	Sensitivity (cm/g) or Magnification	Period (sec)	Amplitude (cm/sec^2 or cm)	from Epicenter (miles)
10. Pasadena, Caltech Faculty Club and Millikan Basement (cont.)									133
10b		East	206	.061	8	7.8	.35	9	
		Down	209	.065	8	8.0	.55	5	
		North	208	.064	11	7.8	.3	7	
11. Pasadena, Jet Propulsion Laboratory									137
11a	9th	S 08 W	119	.0659	10.5	15.5	1.12	23	
							.36	2	
		down	118	.0619	9.5	15.3	.17	6	
		S 82 E	114	.0620	9	15.4	1.01	31	
							1.14	17	
							.24	5	
11b	Bsmt	S 08 W	123	.064	9	16.0	.77	4	
							.20	2	
		down	115	.064	9	15.7	.42	3	
							.3	2	
		S 82 E	120	.066	10	15.9	.9	6	
							.33	4	
12. Glendale, 633 East Broadway									142
		S 70 E	106	.050	10	7.6	.75	19	
		down	121	.050	10	7.6	.75	17	
		S 20 W	105	.048	12	7.6	.75	23	
13. Los Angeles, 1640 Marengo									135
13a	8th	N 38 W	471	.052	10	7.6	.61	50	
							.70	23	
		down	449	.054	10	7.6	.23	5	

(continued on next page)

1	2	3	4	5	6	7	8	9	10
							Maximum		Distance
Record Number	Floor or Location	Direction	Instrument Number	Period (sec)	Damping Ratio, c	Sensitivity (cm/g) or Magnification	Period (sec)	Amplitude (cm/sec^2 or cm)	from Epicenter (miles)
13. Los Angeles, 1640 Marengo (cont.)									135
		S 52 W	447	.052	10	7.6	.60	73	
							.56	23	
13b	4th	N38 W	440	.055	8	7.6	.64	27	
							.60	12	
		down	427	.051	10	7.6	.27	4	
		S 52 W	448	.051	9	7.6	.63	36	
							.62	12	
13c	1st	S 52 W	420	.051	9	7.6	.70	13	
		down	419	.048	9	7.6	.23	3	
		S 38 E	434	.053	9	7.6	1.06	12	
14. Vernon, CMD Building									134
		up	256	.064	9	10.4	.27	5	
		S 07 W	257	.065	10	10.8	.21	5	
							.69	11	
		N83 W	258	.065	7	11.1	.21	5	
							.83	11	
15. Los Angeles, Univ. of Southern California, Vivian Hall									138
15a	Roof	N61 W	114	.052	11	7.6	.50	32	
							.52	15	
		down	115	.052	10	7.6	.38	3	
		S 29 W	117	.052	10	7.6	.52	26	
							.58	23	
15b	4th	N61 W	119	.056	10	7.6	.50	13	
							.45	6	
		down	120	.058	10	7.6	.47	3	

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1	2	3	4	5	6	7	8	9	10
							Maximum		
Record Number	Floor or Location	Direction	Instrument Number	Period (sec)	Damping Ratio, ε	Sensitivity (cm/g) or Magnification	Period (sec)	Amplitude (cm/sec^2 or cm)	Distance from Epicenter (miles)
15. Los Angeles, Univ. of Southern California, Vivian Hall									138
		S 29 W	121	.057	12	7.6	.62	14	
							.58	13	
15c	Bsmt	N 61 W	124	.055	11	7.6	.37	3	
		down	122	.056	11	7.6	.71	8	
		S 29 W	123	.053	10	7.6	.85	6	
16. Los Angeles, 3407 W. 6th Street									139
16a	8th	South	404	.053	10	7.6	1.50	29	
							1.35	14	
		down	509	.054	10	7.6	.20	4	
		East	439	.053	10	7.6	1.23	20	
							1.28	9	
16b	4th	South	362	.053	10	7.6	.57	9	
		down	342	.055	10	7.6	.70	3	
		East	415	.056	10	7.6	.32	7	
16c	Bsmt	South	426	.049	11	7.6	.51	10	
		down	506	.051	13	7.6	.30	3	
		East	397	.051	10	7.6	.50	8	
17. Los Angeles, 3470 Wilshire Blvd.									139
17a	11th	East	228	.048	10	7.6	.69	24	
							.73	10	
		down	213	.047	9	7.6	.42	4	
		North	223	.050	10	7.6	1.00	32	
							.97	32	

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1	2	3	4	5	6	7	8	9	10
							Maximum		Distance
Record Number	Floor or Location	Direction	Instrument Number	Period (sec)	Damping Ratio, ε	Sensitivity (cm/g) or Magnification	Period (sec)	Amplitude (cm/sec^2 or cm)	from Epicenter (miles)
17. Los Angeles, 3470 Wilshire Blvd.									139
17b	5th	East	549	.053	9	7.6	.77	13	
		down	563	.053	9	7.6	.61	4	
		North	551	.058	8	7.6	1.08	23	
17c	Sub Bsmt	North	572	.056	9	7.6	.41	3	
		down	568	.054	8	7.6	.57	2	
		West	571	.055	10	7.6	.60	2	
18. Los Angeles, 3710 Wilshire Blvd.									140
18a	11th	West	515	.055	10	7.6	.97	31	
							1.04	17	
		down	522	.055	10	7.4	.60	5	
		South	519	.054	9	7.6	.78	35	
							.83	21	
18b	5th	West	526	.052	11	7.5	.82	17	
							.87	11	
		down	517	.055	9	7.9	1.07	4	
		South	525	.054	8	8.0	1.04	14	
18c	Bsmt	West	513	.058	10	7.6	.68	6	
		down	514	.052	10	7.4	.52	5	
		South	524	.055	10	7.6	.39	3	
19. Los Angeles, 4867 Sunset Blvd.									140
19a	7th	S 89 W	171	.052	10	6.2	.37	35	
		down	169	.048	10	6.1	.62	4	
		S 01 E	—	.048	10	6.3	.35	21	

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1	2	3	4	5	6	7	8	9	10
							Maximum		
Record Number	Floor or Location	Direction	Instrument Number	Period (sec)	Damping Ratio, ε	Sensitivity (cm/g) or Magnification	Period (sec)	Amplitude (cm/sec^2 or cm)	Distance from Epicenter (miles)
19. Los Angeles, 4867 Sunset Blvd. (cont.)									140
19b	2nd	S 01 E	175	.049	10	7.6	.63	10	
		down	172	.048	10	7.6	.44	3	
		N 89 E	139	.051	9	7.6	.43	9	
19c	Bsmt	S 89 W	155	0.049	10	7.6	1.00	5	
		down	—	0.049	10	7.7	.34	3	
		S 01 E	166	0.049	10	7.2	.73	8	
20. Los Angeles, 4680 Wilshire Blvd.									140
20a	6th	N 15 E	177	.045	9	7.3	.46	8	
		down	178	.046	9	7.8	.58	3	
		N 75 W	180	.047	11	7.5	.49	13	
20b	3rd	N 15 E	173	.049	9	7.5	.47	7	
		down	168	.049	10	7.3	.58	4	
		N 75 W	170	.047	9	7.6	.46	7	
20c	Bsmt	N 15 E	176	.048	9	7.7	.75	6	
		down	138	.049	8	8.1	not measurable		
		N 75 W	145	.047	9	7.5	.73	6	
21. Los Angeles, Hollywood Storage									142
21a	Penthouse	up	193	.045	8	6.3	.56	9	
		South	192	.046	8	6.7	1.4	22	
		West	191	.045	8	6.5	.52	30	
21b	Bsmt	up	217	.065	10	12.8	.57	4	
		East	216	.066	10	13.3	.67	10	
		South	215	.064	7	12.4	.76	11	

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1	2	3	4	5	6	7	8	9	10
							Maximum		Distance
Record Number	Floor or Location	Direction	Instrument Number	Period (sec)	Damping Ratio, ε	Sensitivity (cm/g) or Magnification	Period (sec)	Amplitude (cm/sec^2 or cm)	from Epicenter (miles)
21. Los Angeles, Hollywood Storage (cont.)									142
21c	P. E. lot	up	214	.065	9	12.9	.45	3	
		East	213	.065	8	12.1	.60	5	
		South	212	.066	10	13.2	.50	7	
22. Los Angeles, 7080 Hollywood Blvd.									147
22a	12th	East	142	.048	8	7.6	1.20	34	
							1.25	32	
		down	141	.048	9	7.6	.035	29	
							.17	4	
		North	146	.047	8	7.6	1.03	24	
22b	6th	East	152	.049	9	7.6	1.20	23	
							1.30	19	
		down	154	.047	10	7.6	.19	2	
		North	148	.050	10	7.6	.98	18	
							1.02	15	
22c	Bsmt	East	137	.044	9	7.6	1.90	9	
		down	144	.044	9	7.6	not measurable		
		North	143	.045	10	7.6	1.05	5	
23. Los Angeles, 120 North Robertson									144
23a	9th	S 02 W	532	.056	10	7.6	.58	19	
							.67	15	
		down	536	.056	9	7.6	.30	5	
		S 88 E	528	.054	9	7.6	.50	26	
23b	4th	S 02 W	539	.052	9	7.3	.38	8	
		down	535	.053	8	7.4	.44	3	
		S 88 E	538	.056	10	7.4	.60	17	

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1	2	3	4	5	6	7	8	9	10
							Maximum		
Record Number	Floor or Location	Direction	Instrument Number	Period (sec)	Damping Ratio, ε	Sensitivity (cm/g) or Magnification	Period (sec)	Amplitude (cm/sec^2 or cm)	Distance from Epicenter (miles)
23. Los Angeles, 120 North Robertson (cont.)									144
23c	Bsmt	S 02 W	530	.053	10	7.6	.62	6	
		down	534	.054	9	7.6	.94	4	
		S 88 E	533	.057	10	7.6	1.32	7	
24. Los Angeles, 1901 Avenue of the Stars									145
24a	21st	N 46 W	187	.050	9	7.6	.72	29	
							.30	5	
		down	190	.048	9	7.6	.30	7	
		S 44 W	181	.050	9	7.6	.97	18	
							.33	6	
24b	9th	N 46 W	183	.050	8	7.6	.74	13	
							.25	9	
		down	184	.051	9	7.6	.27	5	
		S 44 W	191	.049	9	7.6	1.00	13	
							.33	6	
24c	Sub Basmt	N 46 W	182	.051	10	7.6	.23	3	
							.7	1	
		down	194	.051	9	7.6	.58	4	
							.27	3	
		S 44 W	185	.051	9	7.6	.36	4	
							.4	3	
25. Los Angeles, 945 Tiverton									147
25a	14th	N 78 W	554	.054	10	7.6	1.12	26	
		down	540	.055	9	7.6	.2	4	
		S 12 W	560	.054	11	7.6	1.04	24	
							.3	6	

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1	2	3	4	5	6	7	8	9	10
Record Number	Floor or Location	Direction	Instrument Number	Period (sec)	Damping Ratio, ε	Sensitivity (cm/g) or Magnification	Maximum Period (sec)	Maximum Amplitude (cm/sec^2 or cm)	Distance from Epicenter (miles)
25. Los Angeles, 945 Tiverton (cont.)									147
25b	8th	N 78 W	555	.060	10	7.6	1.1	17	
		down	561	.053	10	7.5	.2	4	
		S 12 W	537	.057	10	7.5	.99	14	
							.29	6	
26. Westwood, U. C. L. A. Engineering Building									148
		up	262	.084	10	21	.21	2	
		North	263	.084	9	21	.93	6	
		East	264	.084	9	22	.43	3	
		West	60	4.7	10	1.0	1.25	.40	
		North	71	4.8	11	1.0	1.25	.40	
27. Encino, 16661 Ventura Blvd.									152
27a	8th	N 80 W	493	.059	11	7.6	.66	15	
		down	408	.058	11	7.6	.55	1	
		S 10 W	463	.058	13	7.6	.76	24	
27b	4th	N 80 W	412	.055	10	7.6	.68	9	
							.21	5	
		down	414	.054	8	7.6	.5	2	
		S 10 W	482	.055	12	7.6	.78	13	
27c	Bsmt	S 10 W	425	.054	11	7.6	.34	8	
							.95	3	
		down	413	.057	10	7.6	.45	1	
		S 80 E	470	.051	10	7.6	.28	5	
							.8	2	

1	2	3	4	5	6	7	8	9	10
							Maximum		
Record Number	Floor or Location	Direction	Instrument Number	Period (sec)	Damping Ratio, ε	Sensitivity (cm/g) or Magnification	Period (sec)	Amplitude (cm/sec^2 or cm)	Distance from Epicenter (miles)
28. Los Angeles, 8244 Orion Blvd.									153
28a	8th	North	512	.053	11	7.6	.57	37	
		down	453	.053	10	7.6	.59	7	
							.27	3	
		West	521	.053	12	7.6	.63	22	
28b	4th	North	520	.053	10	7.0	.58	18	
		down	518	.053	8	7.7	1.8	7	
							.29	3	
		West	511	.053	11	7.7	.64	12	
							.18	6	
28c	1st	North	527	.055	10	7.9	1.1	11	
							.60	5	
							.25	4	
		down	516	.053	9	7.6	1.6	6	
							.25	3	
		West	523	.053	10	7.6	.9	8	
							.29	4	
29. San Fernando, Pacoima Dam									158
		S 74 W	355	.053	10	7.8	not measurable		
		down	311	.052	11	7.7	.2	6	
		S 16 E	352	.051	9	7.8	.3	9	
30. Long Beach, Terminal Island									129
		up	1004	.068	8	13.6	.4	4	
		S 69 W	1005	.067	10	13.5	.4	8	
		N 21 W	1006	.067	11	12.7	.37	5	

1	2	3	4	5	6	7	8	9	10
							Maximum		
Record Number	Floor or Location	Direction	Instrument Number	Period (sec)	Damping Ratio, ε	Sensitivity (cm/g) or Magnification	Period (sec)	Amplitude (cm/sec^2 or cm)	Distance from Epicenter (miles)
31. Long Beach, Utilities Building									127
		up	265	.065	10	12.4	.4	3	
		North	266	.063	10	12.0	.4	5	
		East	267	.065	9	12.5	.6	4	
							1.5	5	
		East	11	1.98	10	0.9	1.5	0.6	
							3.0	0.35	
		South	10	2.2	12	0.9	2.0	0.6	
32. Los Angeles, 2011 Zonal									140
32a	9th	S 62 E	188	.049	10	7.6	.50	49	
							.48	17	
		down	250	.048	10	7.6	.58	7	
		S 28 W	125	.049	12	7.6	.52	26	
							.57	19	
32b	5th	S 62 E	211	.047	9	7.6	.61	4	
		down	227	.046	10	7.6	.47	26	
		S 28 W	218	.048	9	7.6	.58	14	
32c	Bsmt	S 62 E	208	.047	10	7.6	.62	4	
		down	206	.048	11	7.6	.68	9	
		S 28 W	219	.048	11	7.6	.50	7	
33. Los Angeles, 3345 Wilshire Blvd.									139
33a	12th	South	221	.048	9	7.6	.83	32	
							.84	19	
		down	222	.047	10	7.6	.53	5	
		East	220	.048	10	7.6	.68	28	
							.74	14	

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1	2	3	4	5	6	7	8	9	10
Record Number	Floor or Location	Direction	Instrument Number	Period (sec)	Damping Ratio, ε	Sensitivity (cm/g) or Magnification	Maximum Period (sec)	Maximum Amplitude (cm/sec^2 or cm)	Distance from Epicenter (miles)
33. Los Angeles, 3345 Wilshire Blvd. (cont.)									139
33b	2nd	South	193	.049	9	7.6	.88	10	
		down	212	.049	9	7.6	.24	4	
		East	225	.049	10	7.6	.72	10	
33c	B.1	South	230	.047	10	7.6	.72	7	
		down	199	.047	10	7.6	.53	4	
		East	209	.047	10	7.6	.66	6	
34. El Centro									41
		up	208	.067	8.5	13.5	.16	33	
							.21	31	
							2.1	5	
		South	206	.069	7.6	14.7	.16	10	
							1.27	121	
							3.7	12	
		West	207	.067	8.8	13.5	.21	47	
							.52	18	
							1.05	55	
		East	29	6.4	11.4	1.0	5.8	5.6	
							3.4	0.75	
		South	28	6.80	9.4	1.0	1.26	1.6	
							5.8	5.7	
							3.7	3.1	
35. El Centro									
35a		East	LDM	10.10	9.5	1.0			
35b		North	RDM	10.15	10	1.0			
36. San Diego, Light and Power Co.									67
		up	322	.081	9	20	.41	10	
		East	323	.072	11	19	.53	25	
							2.4	18	
		South	324	.080	9	20	.65	29	

1	2	3	4	5	6	7	8	9	10
							Maximum		
Record Number	Floor or Location	Direction	Instrument Number	Period (sec)	Damping Ratio, ε	Sensitivity (cm/g) or Magnification	Period (sec)	Amplitude (cm/sec^2 or cm)	Distance from Epicenter (miles)
37. San Onofre, SCE Power Plant									83
		N 33 E	329	.0531	10	7.98	.15	13	
							.35	40	
		down	304	.0520	10	7.58	.14	45	
							.30	35	
		N 57 W	392	.0517	11.5	7.62	.16	13	
							.20	27	
38. Perris Reservoir, CWR Site									78
		S 07 W	462	.0553	10	7.94	.1	12	
		down	504	.0524	10	7.96	.07	6	
		S 83 E	446	.0542	9.5	8.97	.1	18	
39. San Bernardino, Hall of Records									98
		L		.052	9	1.9	.20	4	
							.12	4	
		V		.051	11	1.9	.13	3	
		T		.051	12	1.9	.9	18	
							.2	4	
40. San Bernardino, Devil's Canyon, CWR									102
		South	136	.0513	9	8.09	.21	7	
		down	137	.0512	9	7.42	.31	9	
		East	186	.0533	9.5	8.14	.21	11	
41. Colton, Southern California Edison Co.									93
41a		up	253	.066	10	13.1	.33	19	
		East	254	.066	10	14.0	.13	18	
		South	255	.065	10	13.4	.28	23	

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1	2	3	4	5	6	7	8	9	10
							Maximum		
Record Number	Floor or Location	Direction	Instrument Number	Period (sec)	Damping Ratio, ε	Sensitivity (cm/g) or Magnification	Period (sec)	Amplitude (cm/sec^2 or cm)	Distance from Epicenter (miles)
41. Colton, Southern California Edison Co. (cont.)									93
41b		North	LDM	9.75	10	1	3.6	1.6	
41c		West	RDM	9.78	10	1	2.6	1.3	
42. Santa Ana, Engineering Building									109
		up	1022	.062	8	11.5	.53	5	
		S 04 E	1023	.062	8	11.9	.72	14	
		S 86 W	1024	.063	8	11.7	.72	14	
		S 86 W	A	4.74	12	1	6.5	1.1	
		S 04 E	B	4.64	10	1	5.3	1.4	
43. Pear Blossom, Pumping Plant, CWR									142
		North	472	.056	7.6	8.0	.60	5	
		down	494	.057	7.6	8.0	.15	6	
		West	489	.049	7.6	6.8	.20	6	
44. Port Hueneme, Navy Laboratory									190
		up	1001	.080	10	19.6	not measurable		
		South	1002	.080	9	19.0	.3	2	
		West	1003	.079	10	19.8	1.1	3	
		West	32	2.49	10	1	1.8	.12	
		North	33	2.30	10	1	2.0	.13	
45. Lake Hughes Array No. 1, CWR									171
		N 21 E	219	.063	12	7.9	.45	9	
		down	207	.060	11	7.9	not measurable		
		N 69 W	248	.061	11	7.8	.50	6	

1	2	3	4	5	6	7	8	9	10
							Maximum		Distance
Record Number	Floor or Location	Direction	Instrument Number	Period (sec)	Damping Ratio, ε	Sensitivity (cm/g) or Magnification	Period (sec)	Amplitude (cm/sec^2 or cm)	from Epicenter (miles)
46. Davis Dam, Mohave Gen. Plant									170
		V		.046		1.9	.18	1	
		T		.047		1.9	.34	3	
							.45	3	
47. Santa Barbara									222
		up	259	.065	8	12	not measurable		
		N 42 E	260	.064	8	11.9	.75	2	
		S 48 E	261	.065	9	12.4	.75	2	
48. Cachuma Dam									240
48a	Crest	up	361	.0621	7	12	not measurable		
		North	362	.060	9	11.5	not measurable		
		East	363	.060	9	10.7	.66	4	
		East	15	2.53	9	.83	2.3	.15	
		South	14	2.30	8	.89	2.7	.1	
48b	Valve House	up	364	.062	11	11.0	not measurable		
		North	365	.062	10	11.4	not measurable		
		East	366	.064	9	12.2	not measurable		
		West	9	5.66	11	1	not measurable		
		up	2	1.94	3	1	2.8	.2	
		North	30	5.49	11	1	2.9	.15	
49. Taft, Lincoln School Basement									237
		up	298	.079	11	17.7	not measurable		
		N 21 E	299	.080	9	19.4	.75	.5	
		S 69 E	300	.081	9	19.7	.83	1.5	

1	2	3	4	5	6	7	8	9	10
							Maximum		
Record Number	Floor or Location	Direction	Instrument Number	Period (sec)	Damping Ratio, ε	Sensitivity (cm/g) or Magnification	Period (sec)	Amplitude (cm/sec^2 or cm)	Distance from Epicenter (miles)
50. Bakersfield									225
50a		West	LDM	10.0	13	1	5	.75	
							11.2	1.92	
50b		South	RDM	9.7	8	1	8.3	2.76	
50c		up	342	.067	8	12.6	.79	1.2	
		South	352	.066	9	12.8	.79	2.8	
		West	353	.064	10	12.4	.68	2.8	
51. Isabella Dam									220
51a	Main Crest	N 14 E		.047	11	1.9	.35	4	
		down		.047	13	1.9	.2	1	
		N 76 W		.048	10	1.9	.31	3	
51b	Aux. Abut-ment	N 14 E		.047	18	1.9	not measurable		
		down		.047	11	1.9	not measurable		
		N 76 W		.048	12	1.9	not measurable		
51c	Aux. Crest	N 14 E		.047	10	1.9	.5	7	
		down		.045	13	1.9	.3	3	
		N 76 W		.047	11	1.9	.5	7	
51d	Aux. Control Tower	N 14 E		.047	18	1.9	.39	2	
		down		.047	11	1.9	not measurable		
		N 76 W		.048	12	1.9	.4	2	
							.65	3	
52. Las Vegas, Nevada, First National Bank									210
	Roof	Down	218	.01507	9	60	2.25	3	
							2.4	3	

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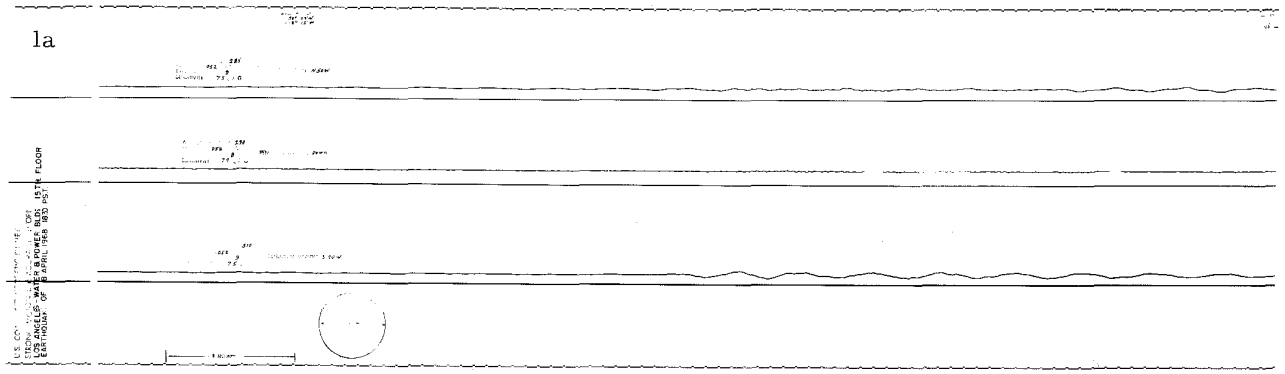
1	2	3	4	5	6	7	8	9	10
							Maximum		Distance
Record Number	Floor or Location	Direction	Instrument Number	Period (sec)	Damping Ratio, ε	Sensitivity (cm/g) or Magnification	Period (sec)	Amplitude (cm/sec^2 or cm)	from Epicenter (miles)
52. Las Vegas, Nevada, First National Bank (cont.)									210
		South	219	.01545	10	68	.9	4	
							1.5	5	
		West	220	.01445	10	63	2.37	21	
							2.5	17	
		East	41	3.90	10	2.42	2.35	1.28	
							2.55	1.04	
		up	116	1.70	10	1.28	2.32	.98	
							2.35	.73	
		South	40	3.50	10	2.34	2	.11	
							2	.41	
							4	.39	
53. Hoover Dam									212
53a	Oil	up	334	.0812	10	19.8	not measurable		
	House	N 45 W	335	.0794	10	20	not measurable		
		N 45 E	336	.0793	10	19.1	not measurable		
		S 45 W	21	5.70	10	1	3.2	.21	
		up	1	2.45	6	1	1.1	.02	
		N 45 W	20	6.30	5	1	2.3	.25	
53b	1215	up	331	.0802	10	19.6	not measurable		
	Gallery	S 45 E	332	.0791	10	19.1	not measurable		
		S 45 W	333	.0791	10	19.1	not measurable		
		N 45 E	23	6.44	20	1	6	.12	
		S 45 E	22	6.30	18	1	6	.25	
53c	Intake	up	328	.0793	10	19.6	not measurable		
	Tower	N 45 W	329	.0819	9	20.8	.87	7	
		N 45 E	330	.0821	9	20.7	.87	5	
		S 45 W	25	5.28	14	1.0	.73	.08	
		N 45 W	24	5.94	29	1.0	.87	.15	

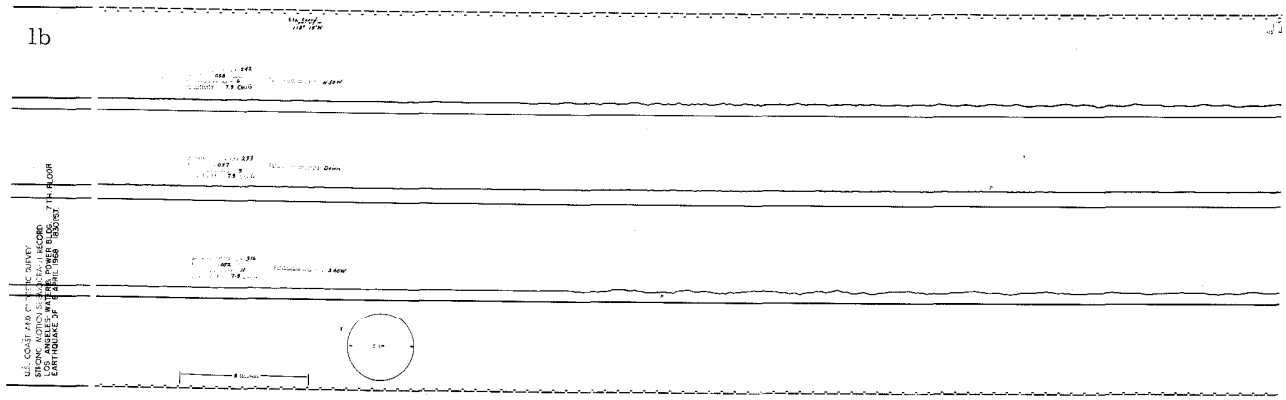
1	2	3	4	5	6	7	8	9	10
							Maximum		
Record Number	Floor or Location	Direction	Instrument Number	Period (sec)	Damping Ratio, ε	Sensitivity (cm/g) or Magnification	Period (sec)	Amplitude (cm/sec^2 or cm)	Distance from Epicenter (miles)
54. Pasadena, Seismology Lab.									137
		L		.070	8	1.9	.2	6	
		V		.069	9	1.9	.24	2	
		T		.069	9	1.9	.2	6	
							.6	7	
55. Santa Felicia Dam									177
55a	Crest	S 47 W	545	.055	13	7.6	.6	6	
		down	546	.055	9	7.6	.8	6	
		S 43 E	544	.055	11	7.6	.7	12	
55b	Outlet Works	S 53 W	547	.054	11	7.6	.84	9	
		down	541	.054	10	7.6	.68	6	
		S 37 E	543	.054	10	7.6	.84	9	
56. Gorman, California, Oso Pumping Plant, CWR									189
		North	404	.053	11	7.6	1.06	13	
		down	401	.056	10	7.7	.69	13	
		West	450	.054	11	7.6	.75	13	
57. Castaic, California, CWR Site									173
		N21E	165	.051	11	7.6	.35	5	
		down	159	.051	3	7.6	.25	3	
		N69W	172	.050	12	7.6	.50	8	
58. Cedar Springs, CWR									104
		S 20 E	250	.058	10	7.6	.60	6	
		down	228	.061	8	7.6	.50	3	
		N70E	231	.057	9	7.6	.12	6	

1	2	3	4	5	6	7	8	9	10
							Maximum		Distance
Record Number	Floor or Location	Direction	Instrument Number	Period (sec)	Damping Ratio, ϵ	Sensitivity (cm/g) or Magnification	Period (sec)	Amplitude (cm/sec^2 or cm)	from Epicenter (miles)
59. Wheeler Ridge, CWR Station									210
		West	178	.051	13	7.6	not measurable		
		down	193	.051	10	7.6	not measurable		
		South	153	.051	10	7.6	not measurable		
60. Fairmont Station									172
		up	339	.076	11	16.3	.5	1	
		N 34 W	340	.076	11	17.0	.5	3	
		N 56 E	341	.076	12	16.3	.5	3	
		S 56 W	80	4.23	11	1	2.3	.07	
		N 34 W	81	3.59	10	1	1.6	.12	
61. San Dimas, Puddingstone Reservoir									117
61		N 25 E	351	.052	10	7.5	.1	9	
							.65	16	
		down	321	.050	9	7.4	.2	4	
		N 65 W	268	.051	10	7.5	.2	9	
							.7	17	

1a



1b



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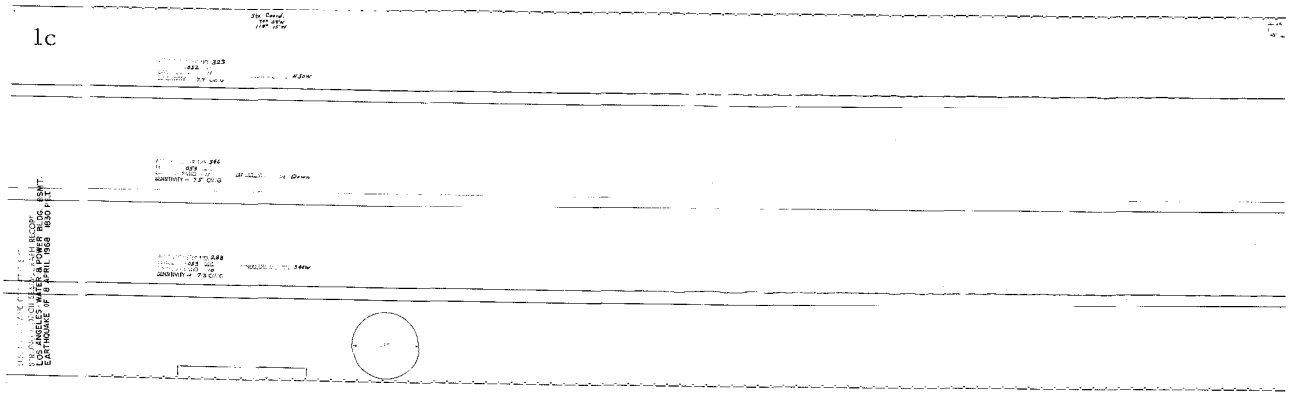
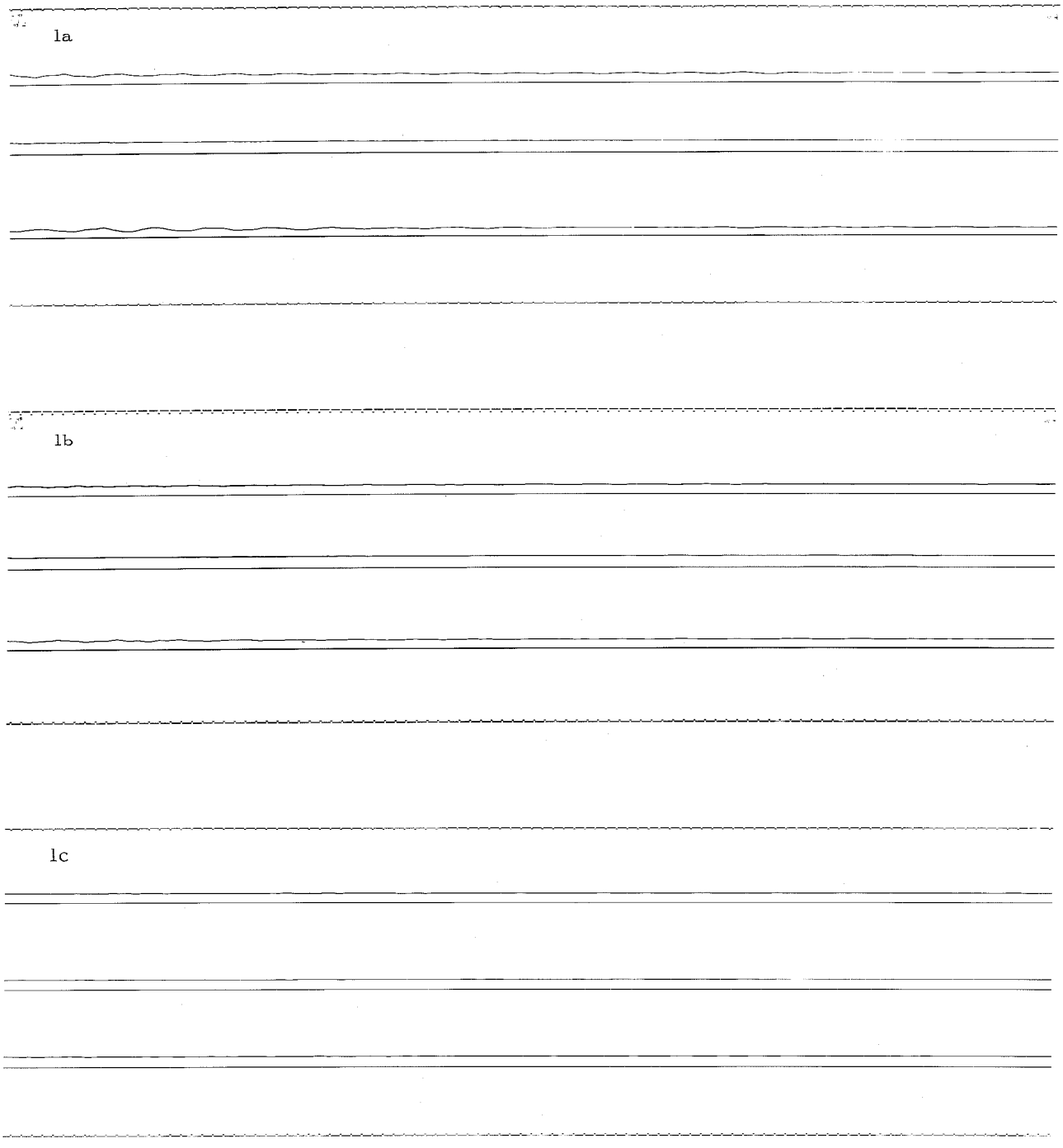
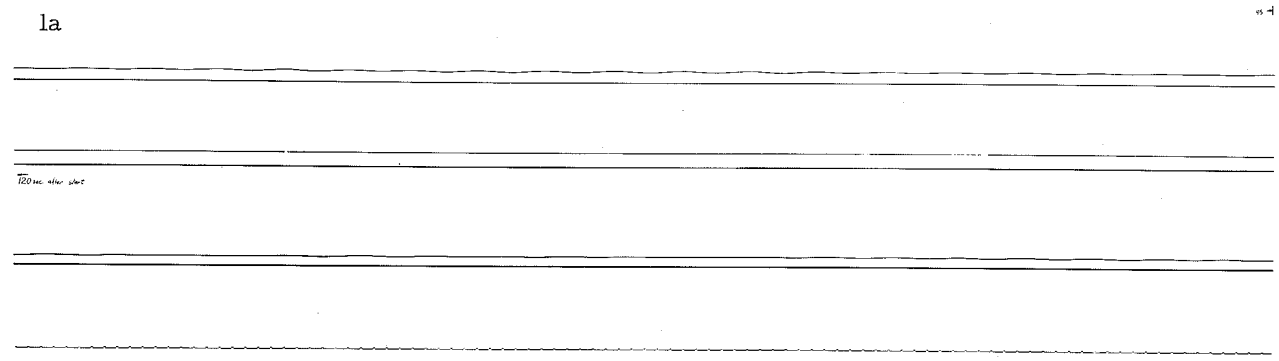
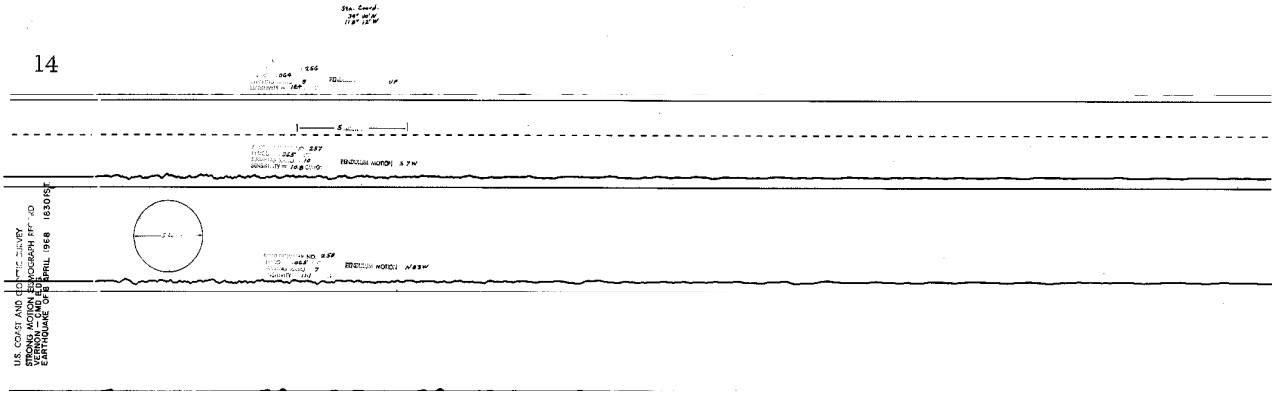



1a
1b
1c

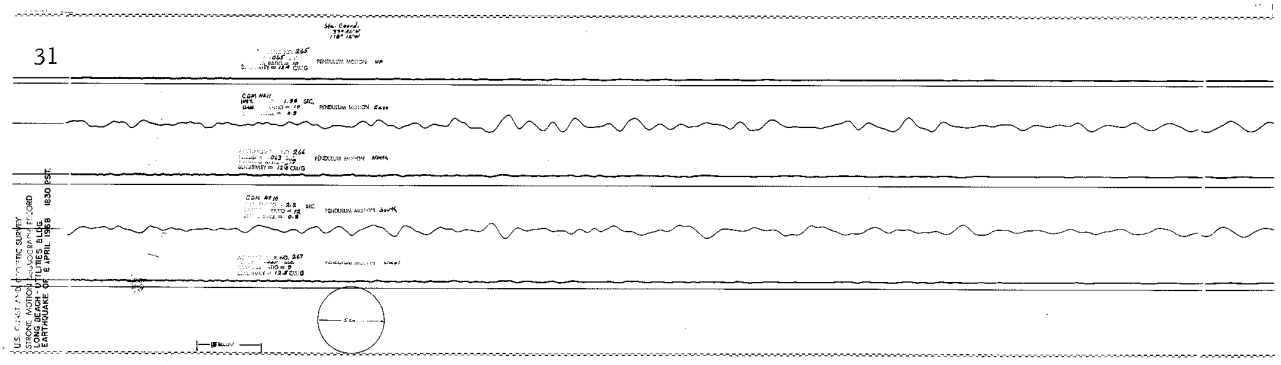
1a

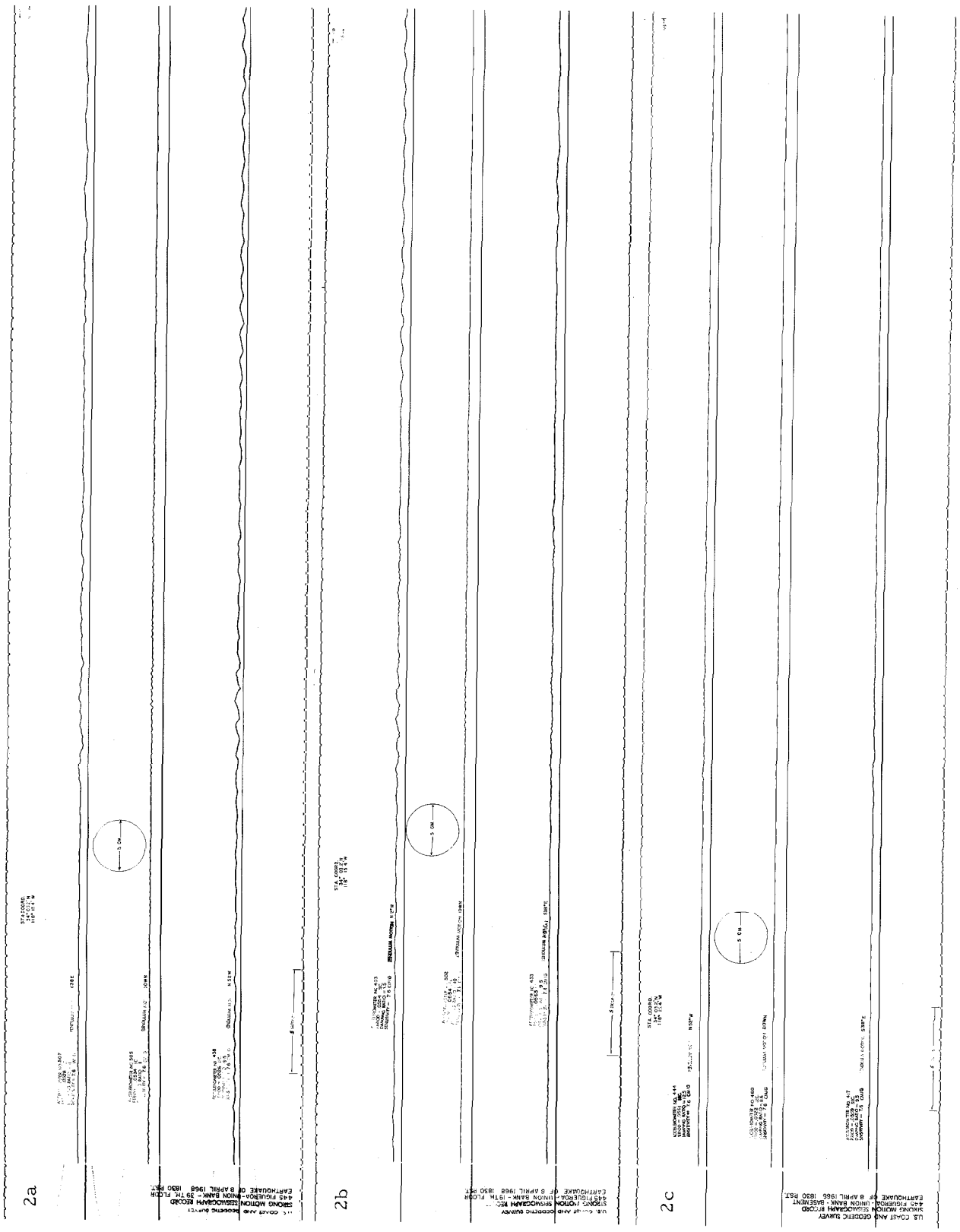

120 sec after shot

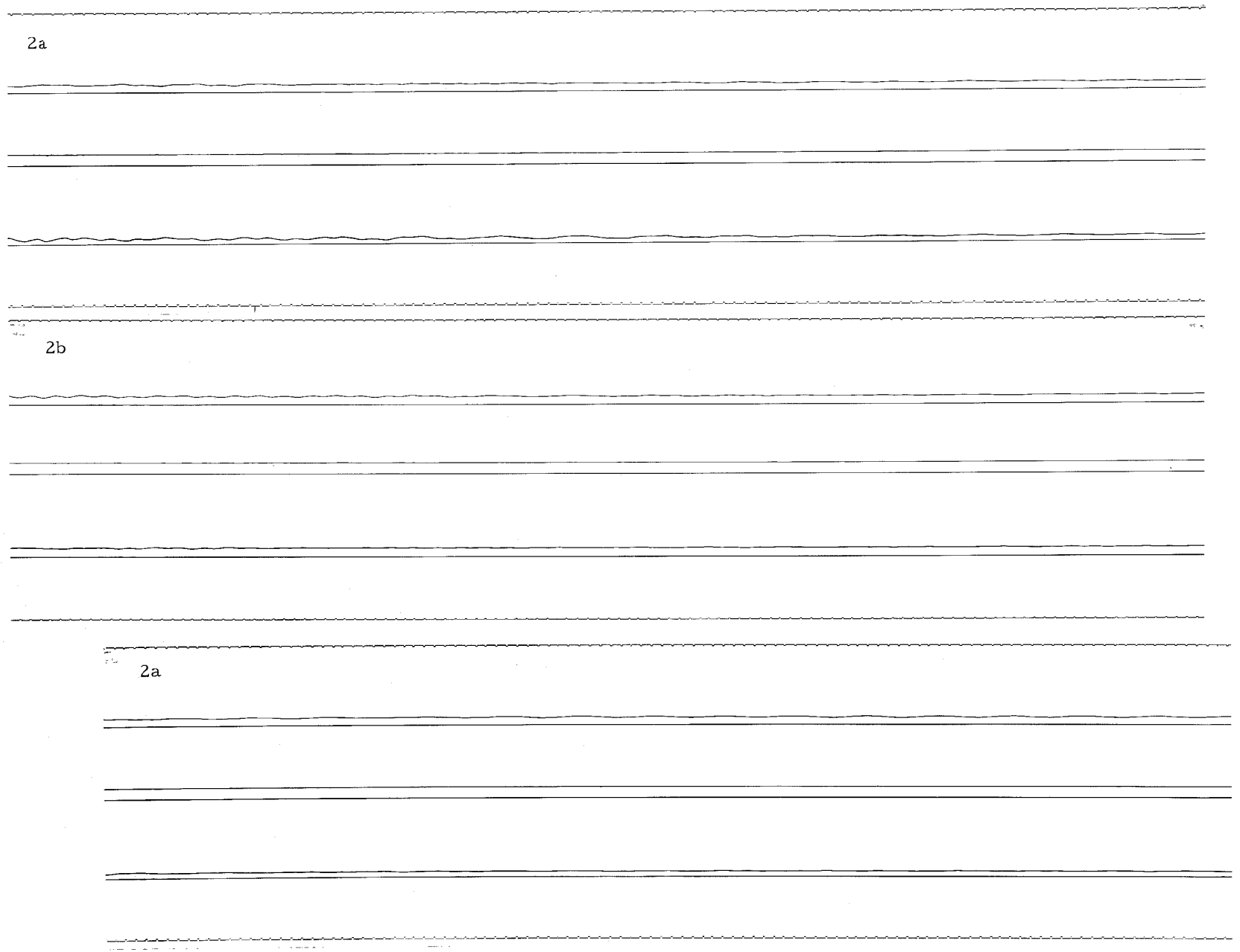
14


U.S. COAST AND GEODETIC SURVEY
STRONG MOTION SEISMOGRAPH RECORD
VERNON AND VICINITY
EARTHQUAKE OF 8 APRIL 1968
1630 PST

31


U.S. COAST AND GEODETIC SURVEY
STRONG MOTION SEISMOGRAPH RECORD
LONG BEACH - U.S. NAVAL BASE
EARTHQUAKE OF 8 APRIL 1968
1630 PST


2a
2b
2c


2a
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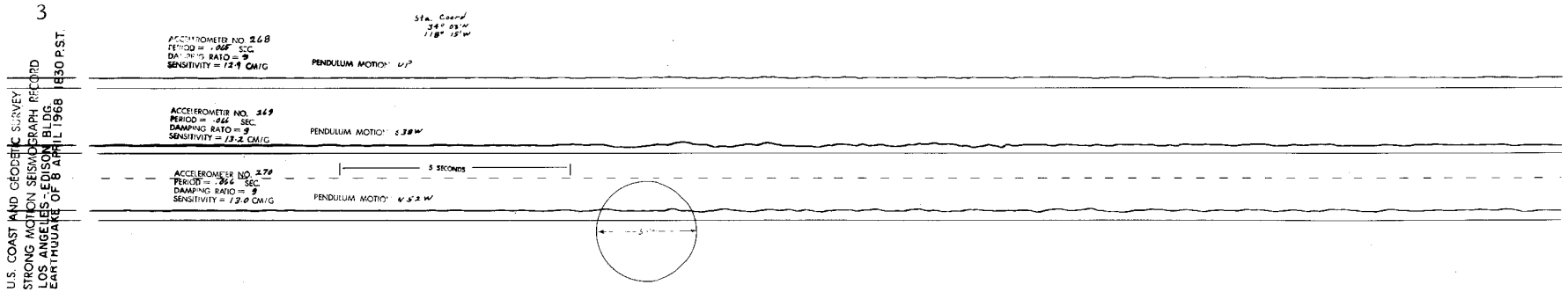
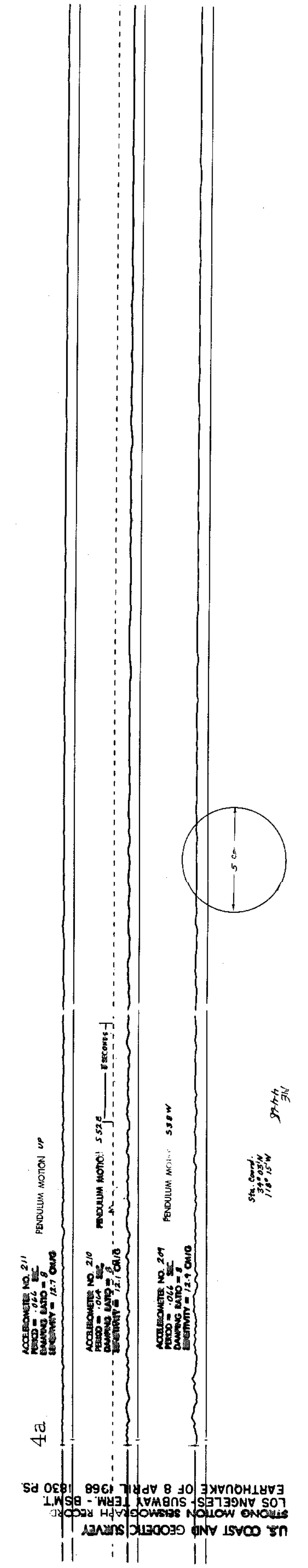
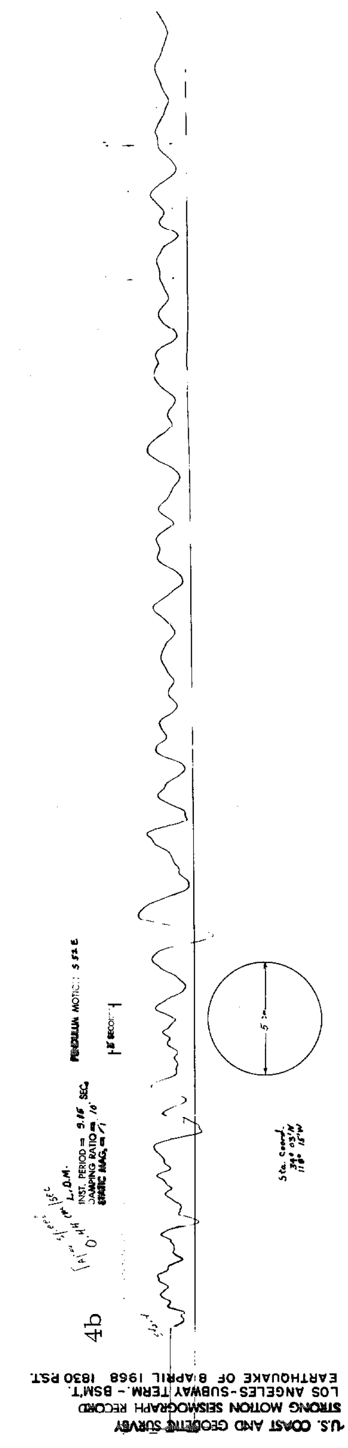
2a

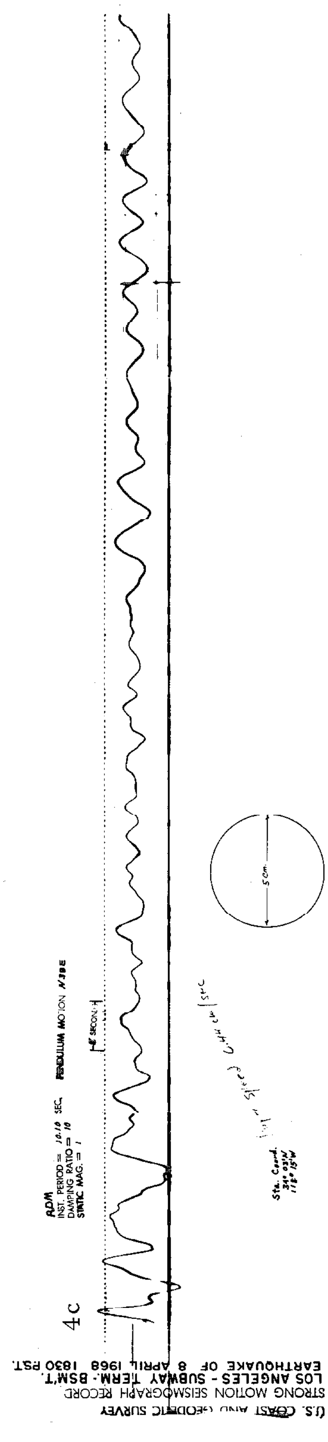

3
U.S. COAST AND GEODETIC SURVEY
STRONG MOTION SEISMOGRAPH RECORD
LOS ANGELES - EDISON BLDG
EARTHQUAKE OF 8 APRIL 1968 1830 P.S.T.
Sta. Coord
34° 03'N
118° 15'W
ACCELEROMETER NO. 268
PERIOD = .065 SEC.
DAMPING RATIO = 0
SENSITIVITY = 12.9 CM/G
PENDULUM MOTION: UP
ACCELEROMETER NO. 269
PERIOD = .066 SEC.
DAMPING RATIO = 0
SENSITIVITY = 13.2 CM/G
PENDULUM MOTION: S38W
ACCELEROMETER NO. 270
PERIOD = .066 SEC.
DAMPING RATIO = 0
SENSITIVITY = 12.0 CM/G
PENDULUM MOTION: N52W
5 SECONDS
5 CM
3


U.S. COAST AND GEODETIC SURVEY
STRONG MOTION SEISMOGRAPH RECORD
LOS ANGELES - SUBWAY TERM. - BSM'T.
EARTHQUAKE OF 8 APRIL 1968 1830 P.S.

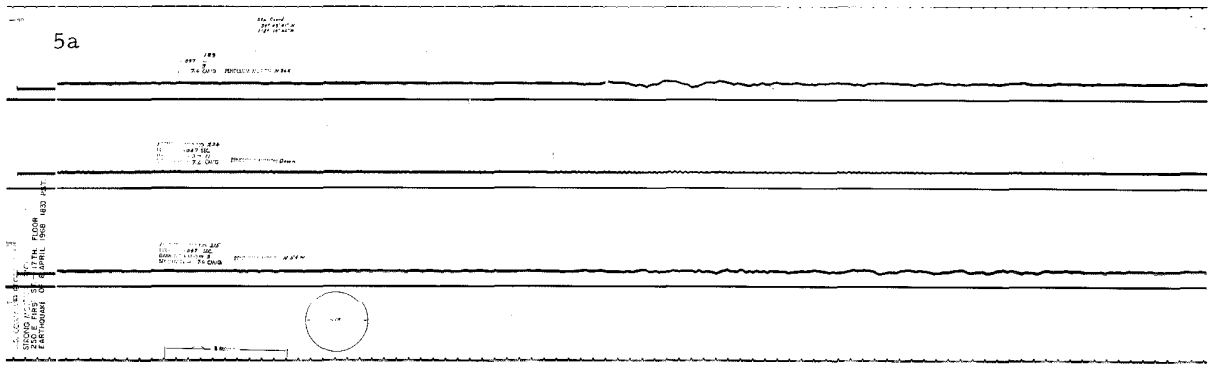
4a


U.S. COAST AND GEODETIC SURVEY
STRONG MOTION SEISMOGRAPH RECORD
LOS ANGELES - SUBWAY TERM. - BSM'T.
EARTHQUAKE OF 8 APRIL 1968 1830 P.S.T.

4b


U.S. COAST AND GEODETIC SURVEY
STRONG MOTION SEISMOGRAPH RECORD
LOS ANGELES - SUBWAY TERM. - BSM'T.
EARTHQUAKE OF 8 APRIL 1968 1830 P.S.T.

4c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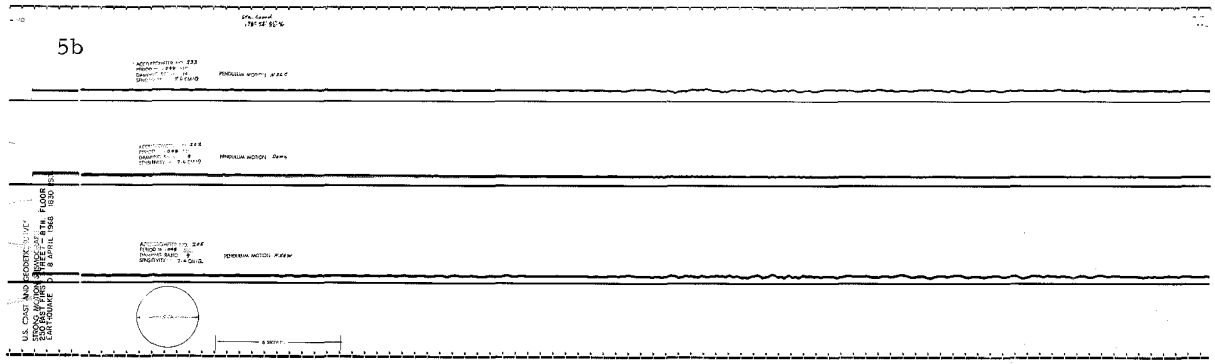
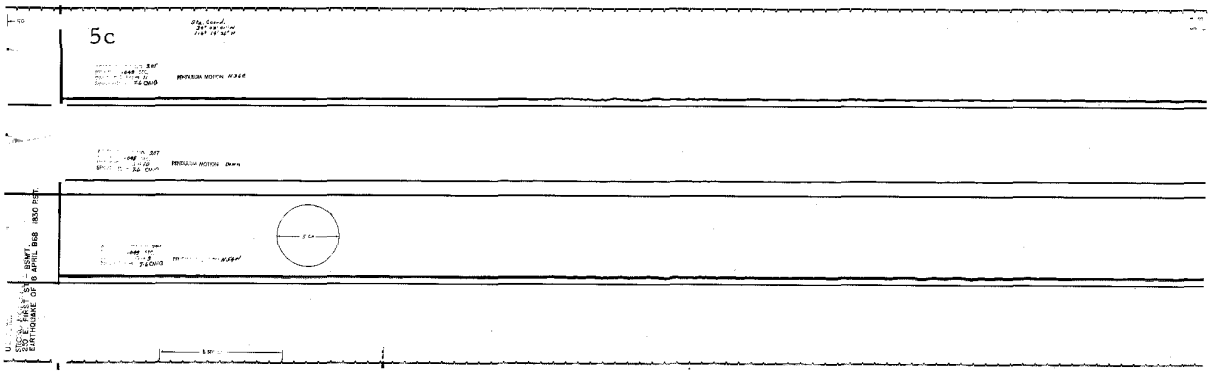
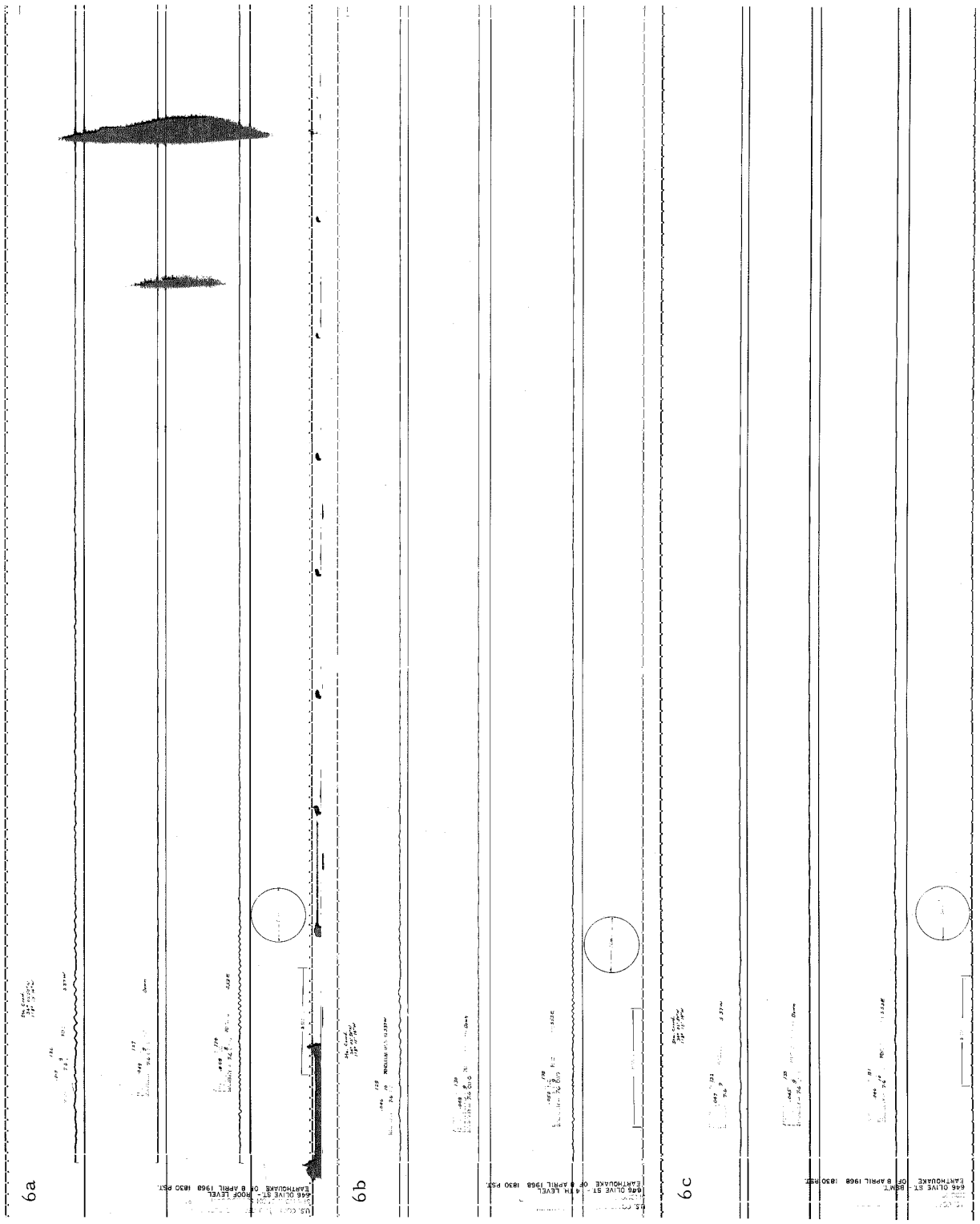

5b


5c

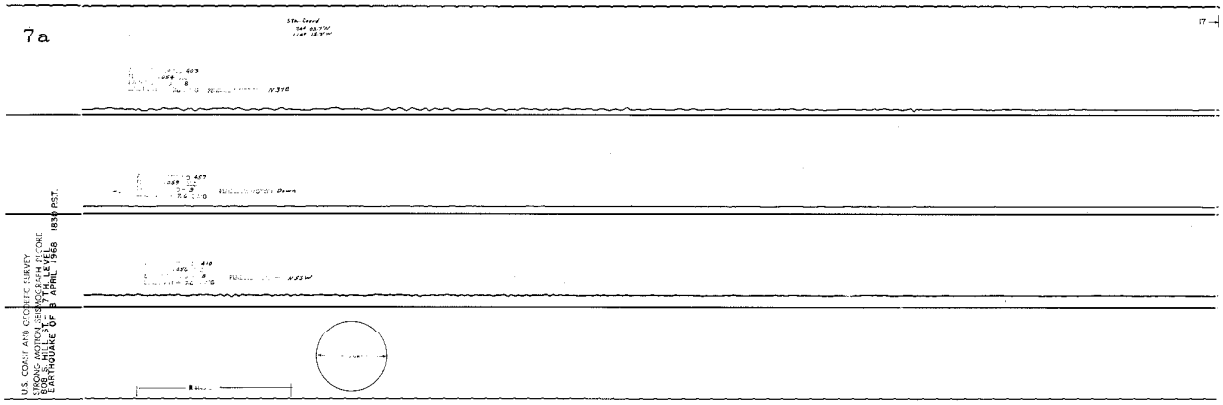
5a

5b

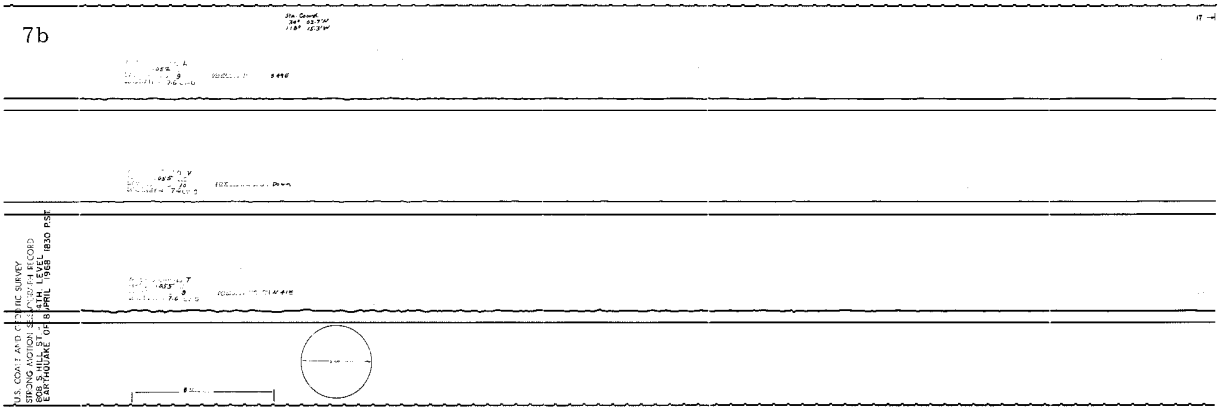
5c


6a
6b
6c

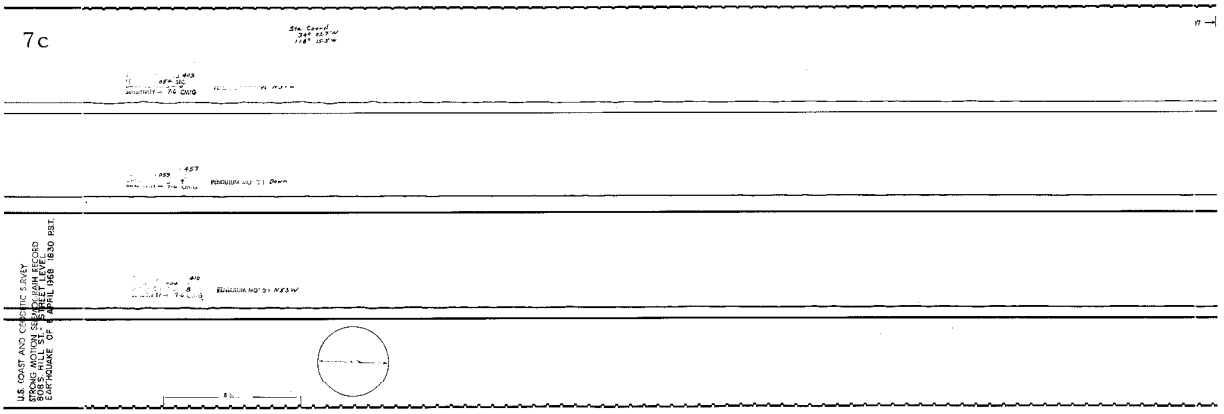
7a


U.S. COAST AND GEODETIC SURVEY
STRONG-MOTION SEISMOGRAPH RECORD
EARTHQUAKE OF 8 APRIL 1968 1830 PST.

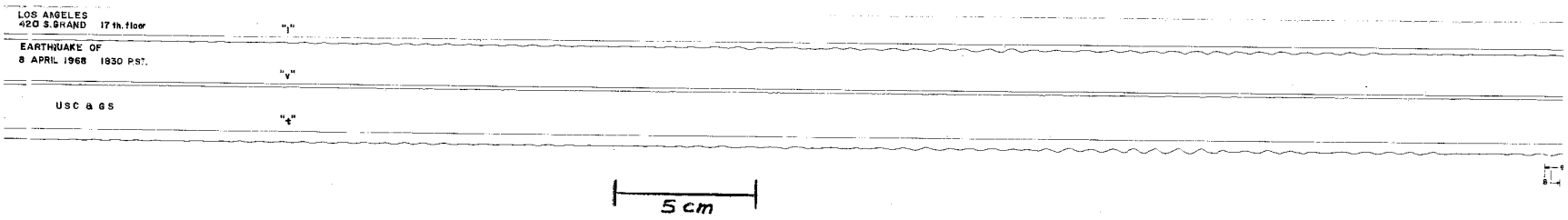
7b


U.S. COAST AND GEODETIC SURVEY
STRONG-MOTION SEISMOGRAPH RECORD
EARTHQUAKE OF 8 APRIL 1968 1830 PST.

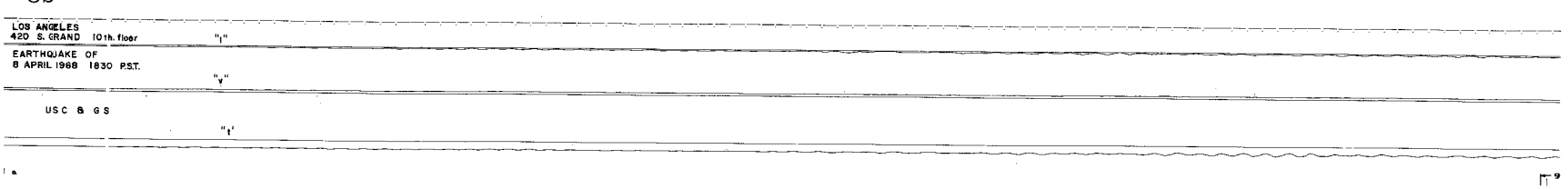
7c


U.S. COAST AND GEODETIC SURVEY
STRONG-MOTION SEISMOGRAPH RECORD
EARTHQUAKE OF 8 APRIL 1968 1830 PST.

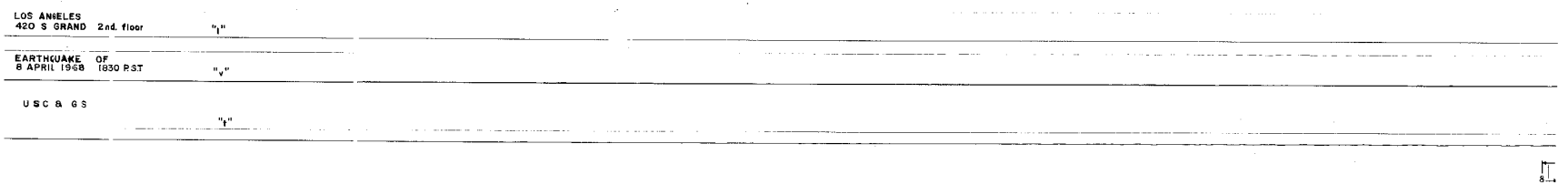
8a

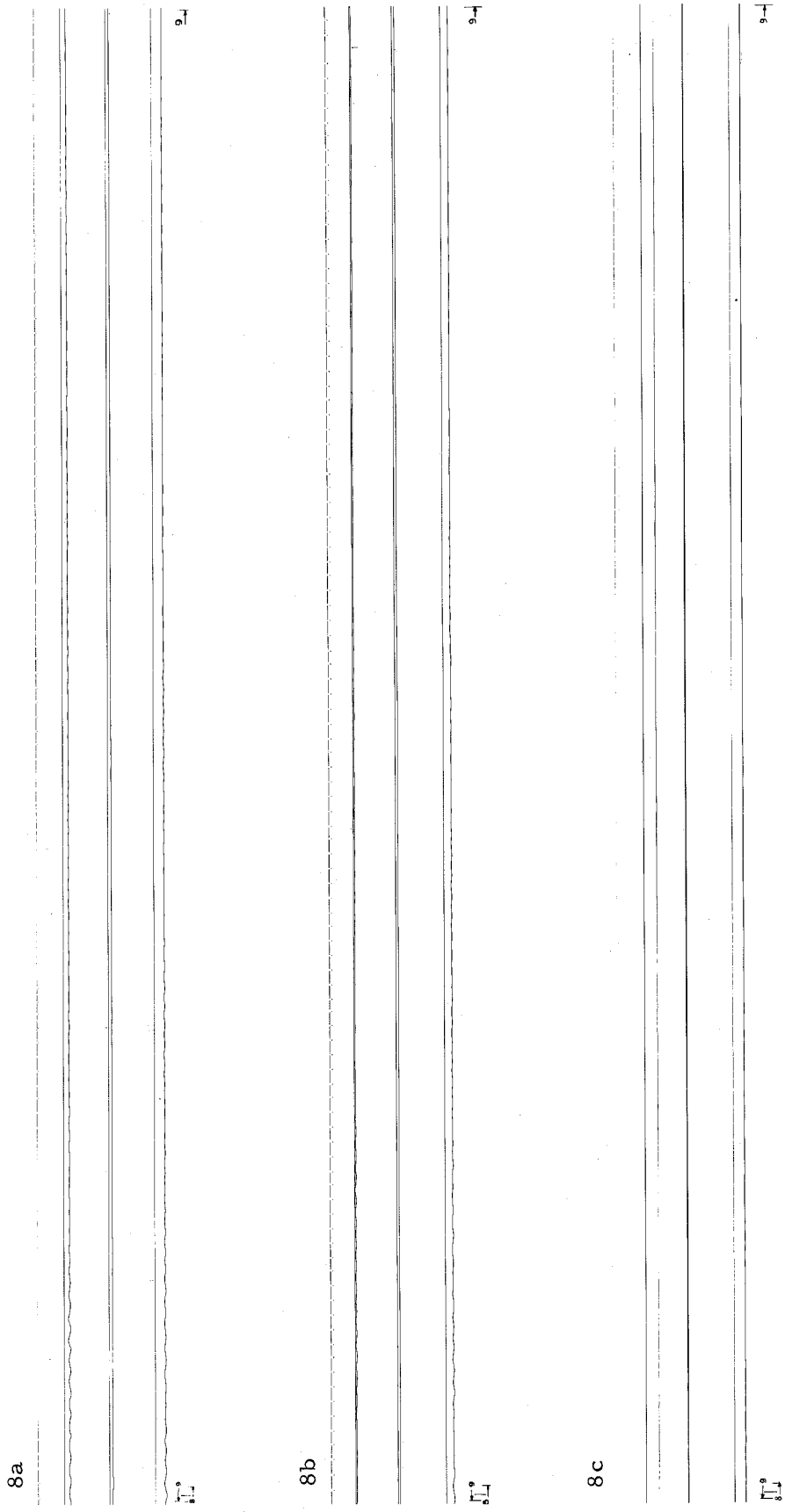

LOS ANGELES
420 S.GRAND 17 th. floor
"l"
EARTHQUAKE OF
8 APRIL 1968 1830 P.S.T.
"v"
USC & GS
"t"
5 cm

8b

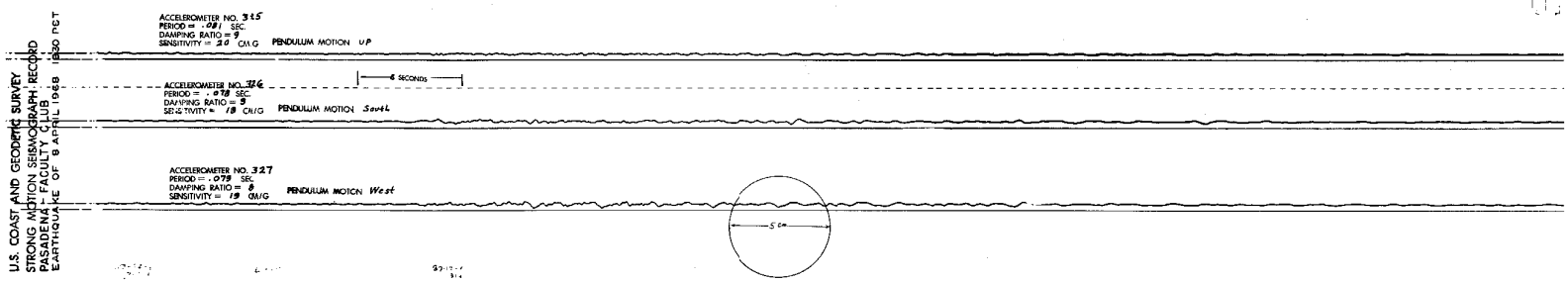

LOS ANGELES
420 S. GRAND 10 th. floor
"l"
EARTHQUAKE OF
8 APRIL 1968 1830 P.S.T.
"v"
USC & GS
"t"

8c

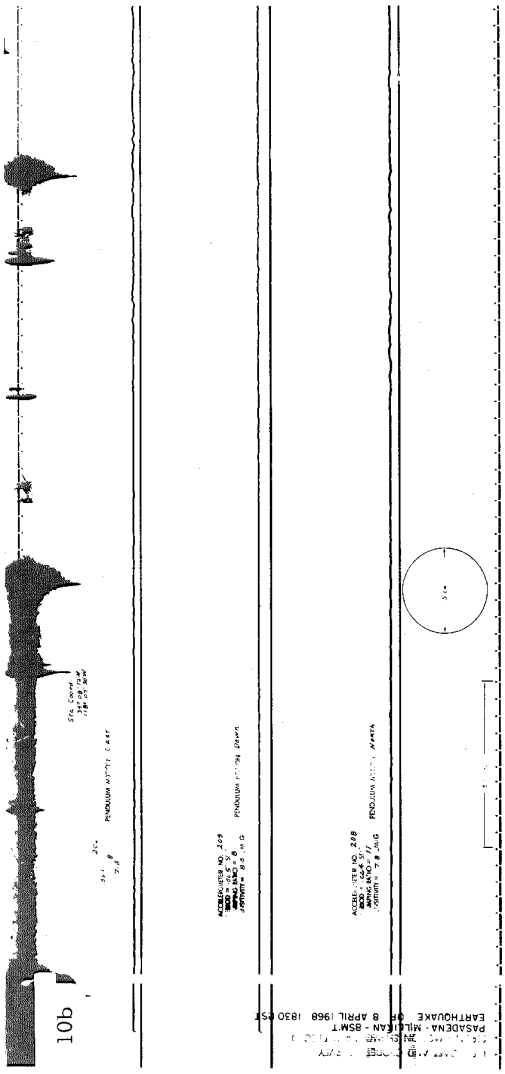

LOS ANGELES
420 S GRAND 2nd. floor
"l"
EARTHQUAKE OF
8 APRIL 1968 1830 P.S.T
"v"
USC & GS
"t"

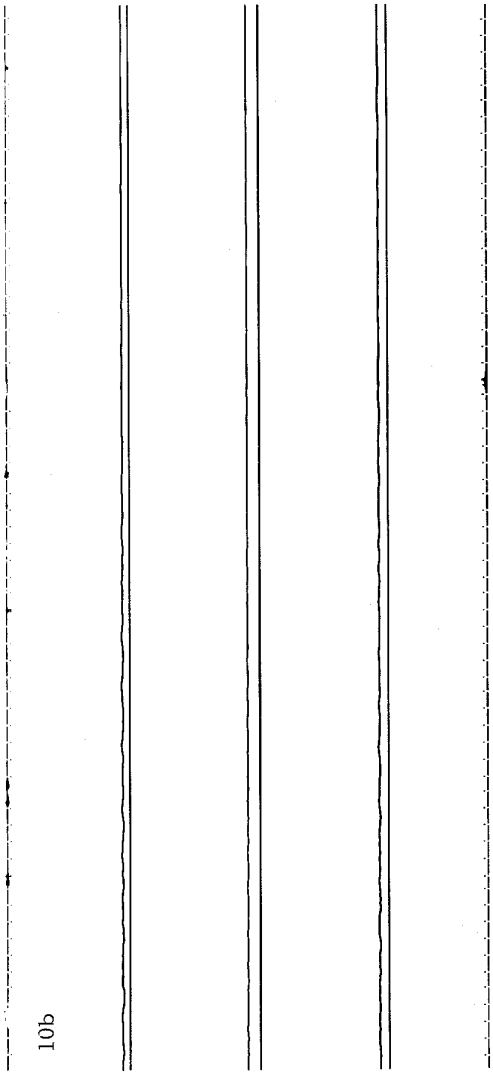

8a
8b
8c

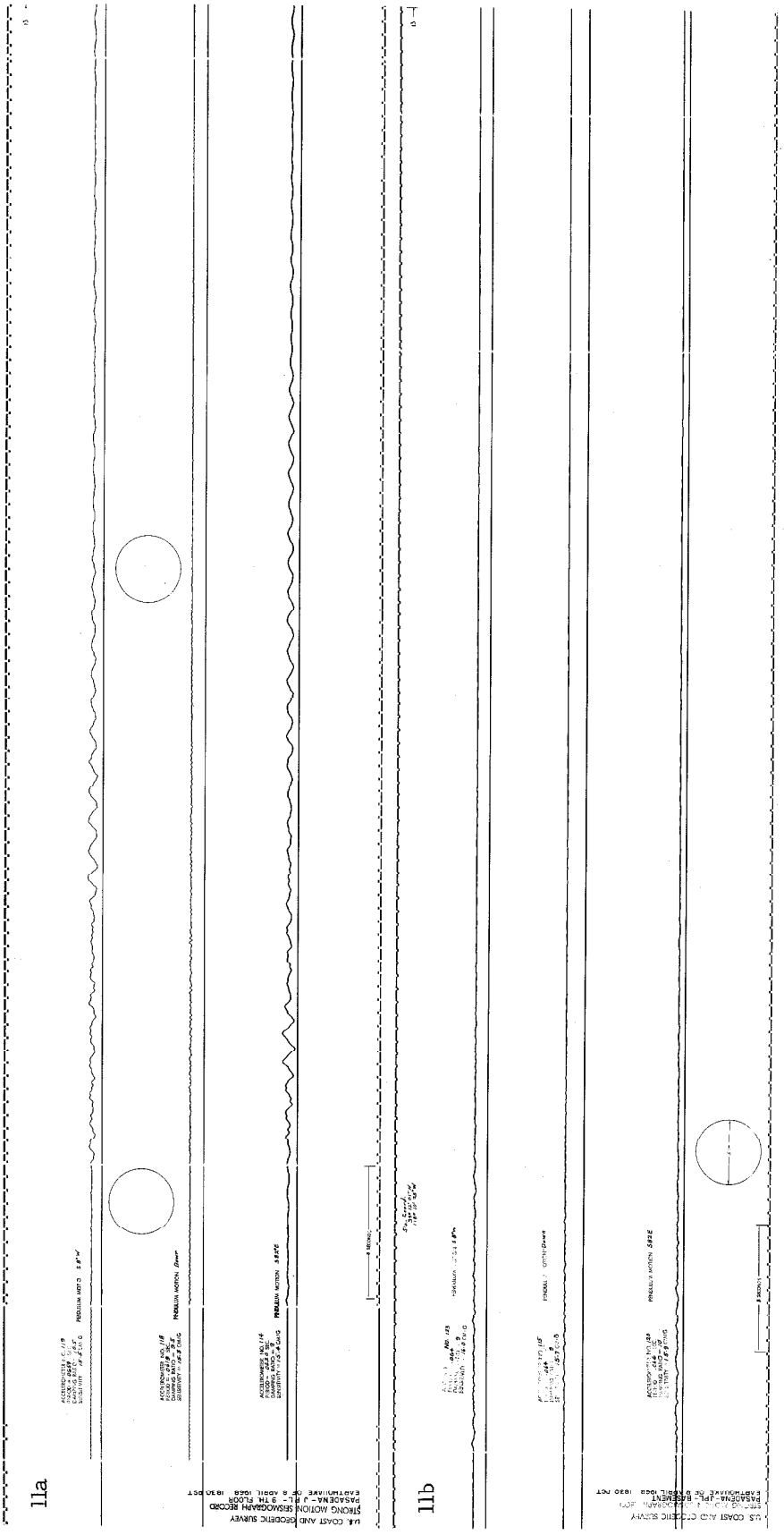
10a


U.S. COAST AND GEODETIC SURVEY
STRONG MOTION SEISMOGRAPH RECORD
PASADENA - FACULTY CLUB
EARTHQUAKE OF 8 APRIL 1968 1830 PST
ACCELEROMETER NO. 325
PERIOD = .081 SEC.
DAMPING RATIO = 9
SENSITIVITY = 20 CM/G PENDULUM MOTION UP
ACCELEROMETER NO. 326
PERIOD = .078 SEC.
DAMPING RATIO = 9
SENSITIVITY = 18 CM/G PENDULUM MOTION South
ACCELEROMETER NO. 327
PERIOD = .079 SEC.
DAMPING RATIO = 8
SENSITIVITY = 19 CM/G PENDULUM MOTION West
6 SECONDS
5 cm

10a


10b
EARTHQUAKE OF 8 APRIL 1968 1830 GST
PASADENA - MILLIKAN - BSMT

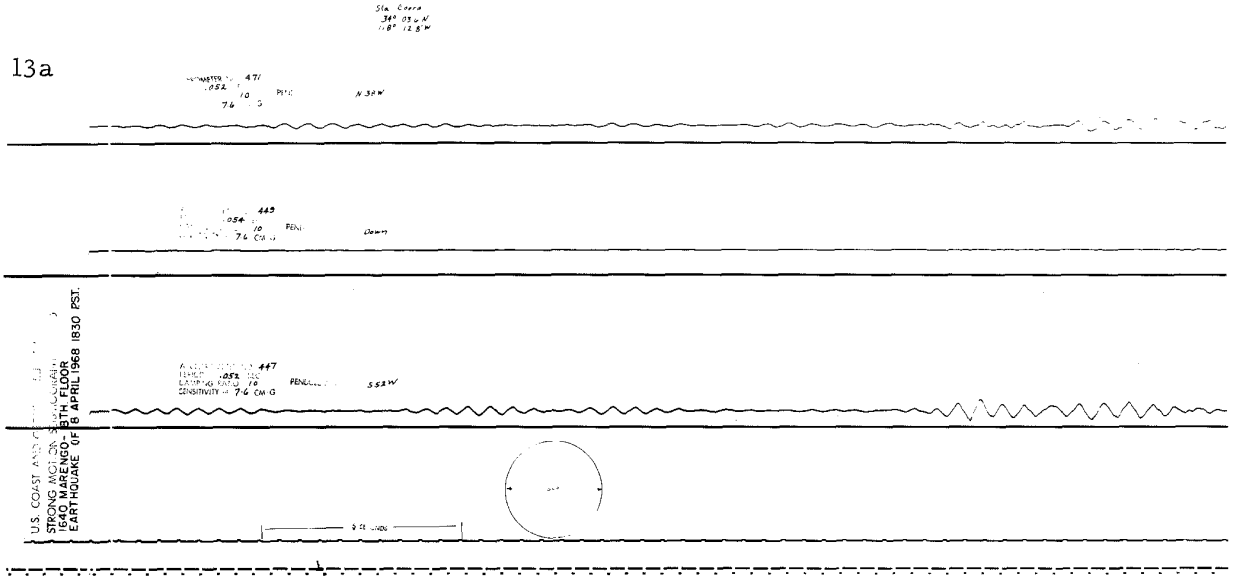

10b



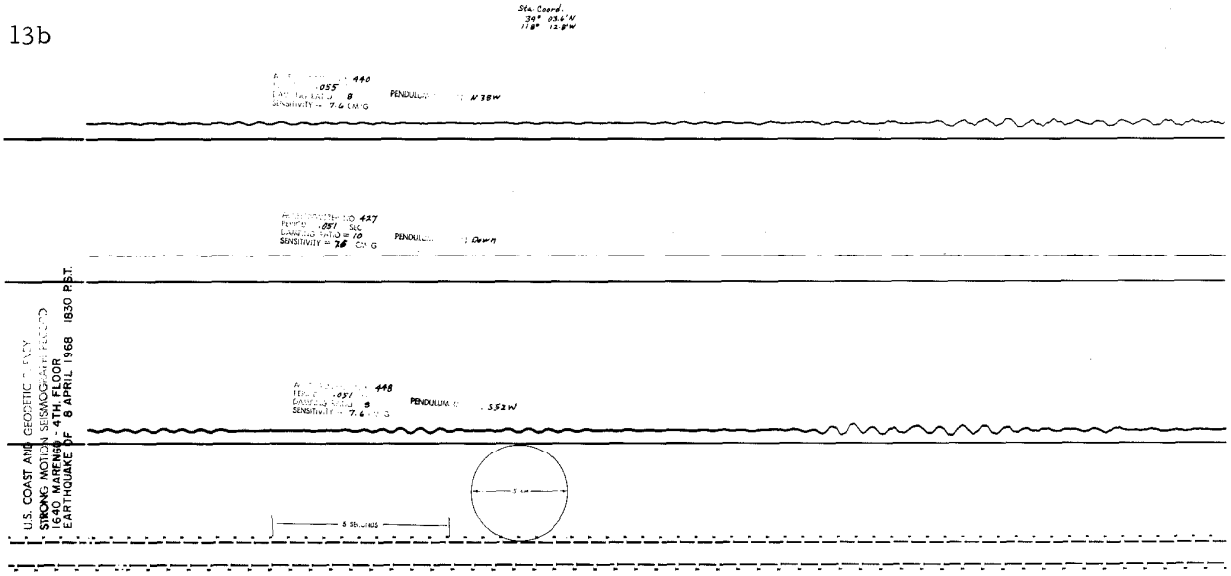
11a

11b

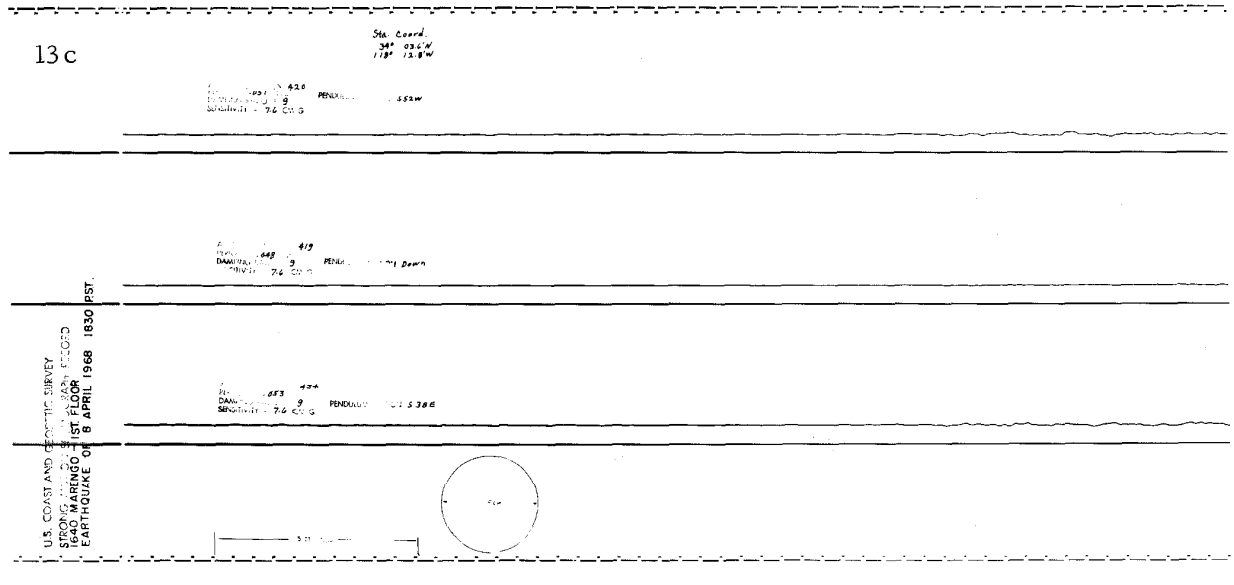
13a


Sta. Coord.
34° 03.6'N
118° 12.8'W
N 38 W
Down
S 52 W
U.S. COAST AND GEODETIC SURVEY
STRONG MOTION SEISMOGRAPH RECORD
1640 MARENGO - 4TH FLOOR
EARTHQUAKE OF 8 APRIL 1968 1830 PST.

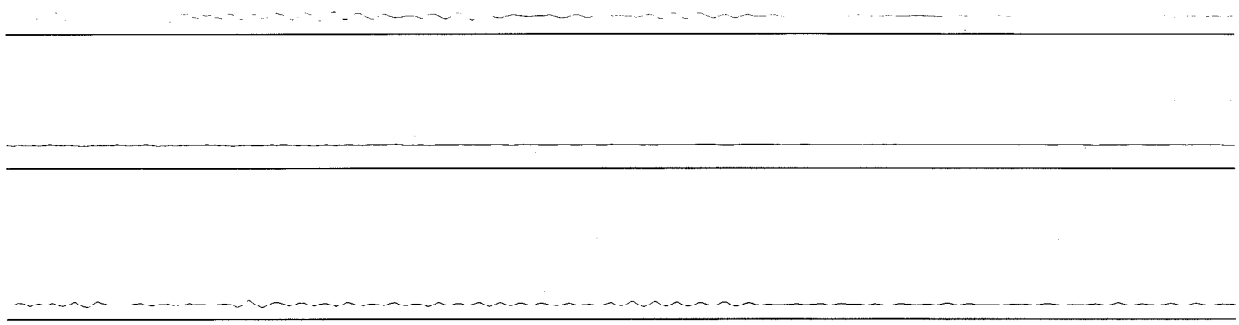
13b


Sta. Coord.
34° 03.6'N
118° 12.8'W
N 38 W
S 52 W
Down
U.S. COAST AND GEODETIC SURVEY
STRONG MOTION SEISMOGRAPH RECORD
1640 MARENGO - 4TH FLOOR
EARTHQUAKE OF 8 APRIL 1968 1830 PST.

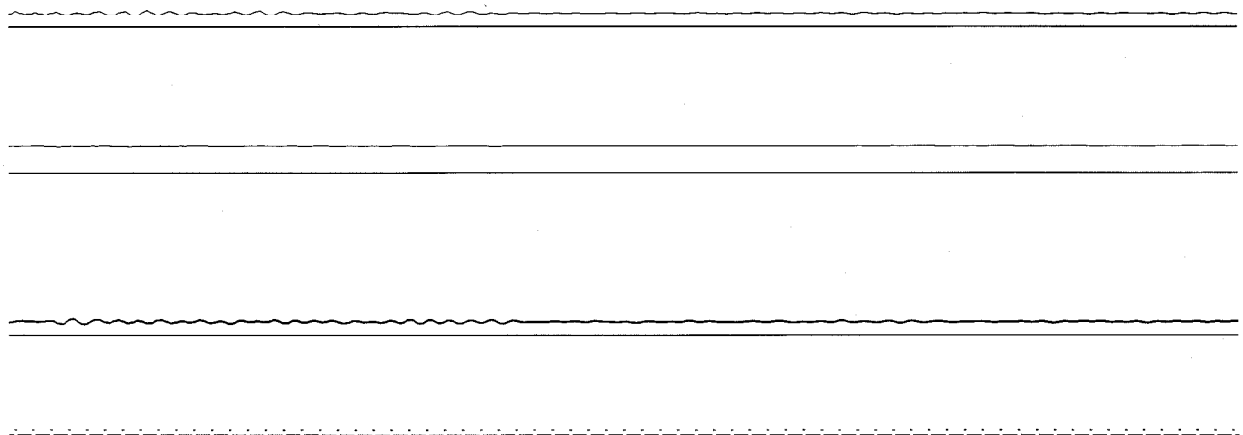
13c


Sta. Coord.
34° 03.6'N
118° 12.8'W
S 52 W
S 38 E
U.S. COAST AND GEODETIC SURVEY
STRONG MOTION SEISMOGRAPH RECORD
1640 MARENGO - 1ST FLOOR
EARTHQUAKE OF 8 APRIL 1968 1830 PST.

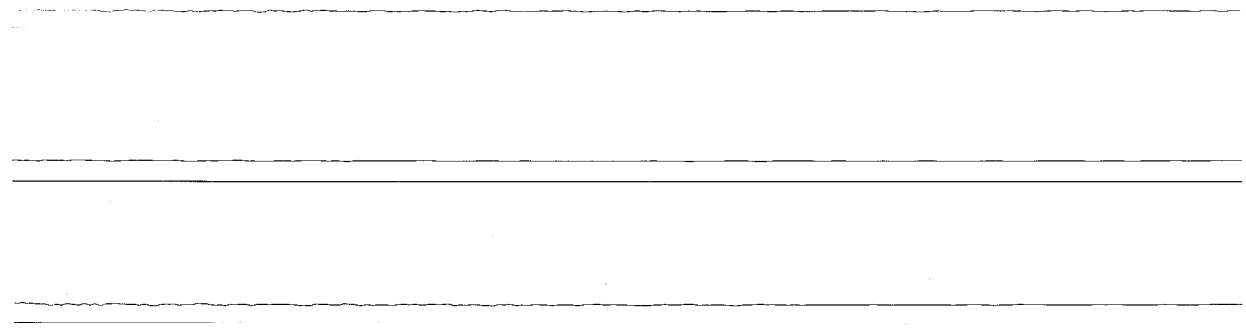
13a



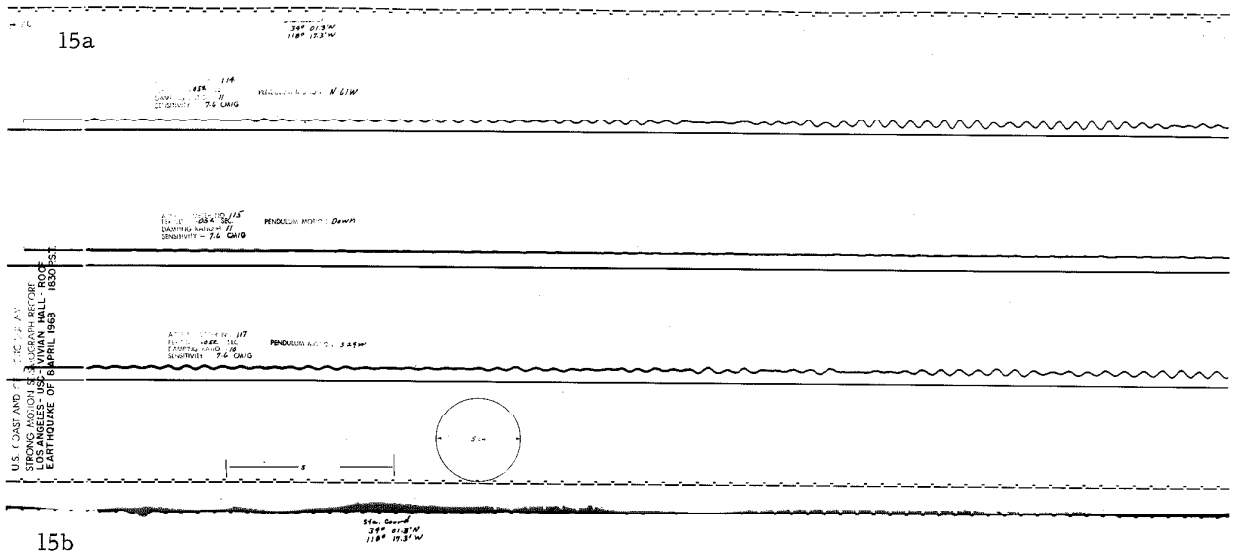
13b



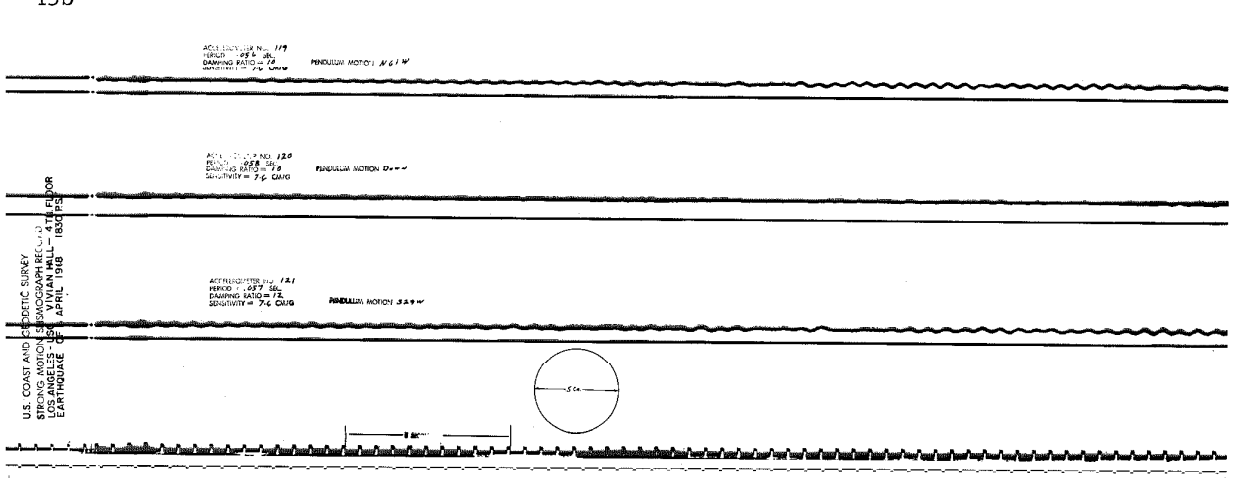
13c



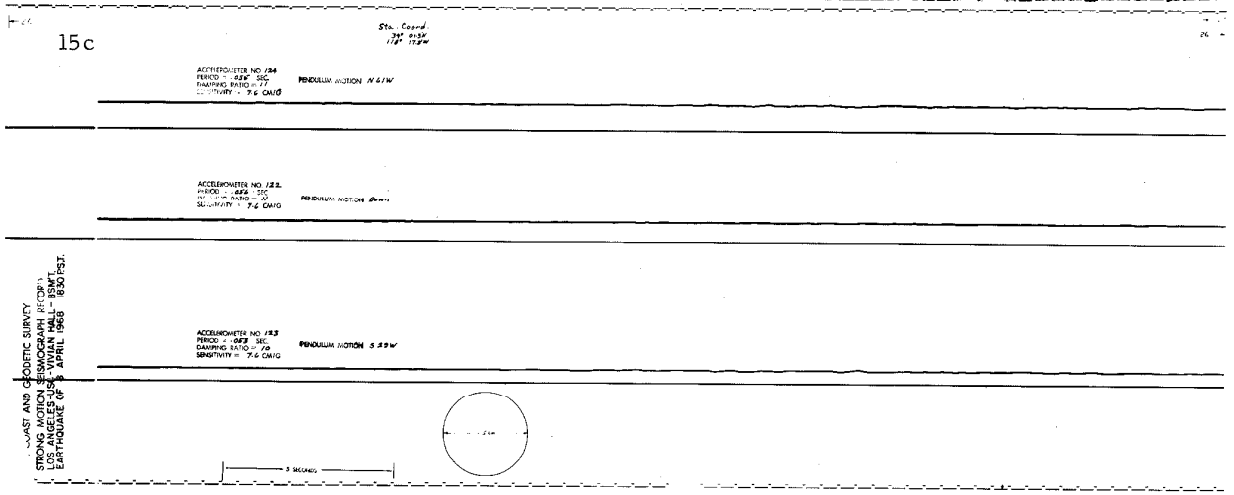
15a

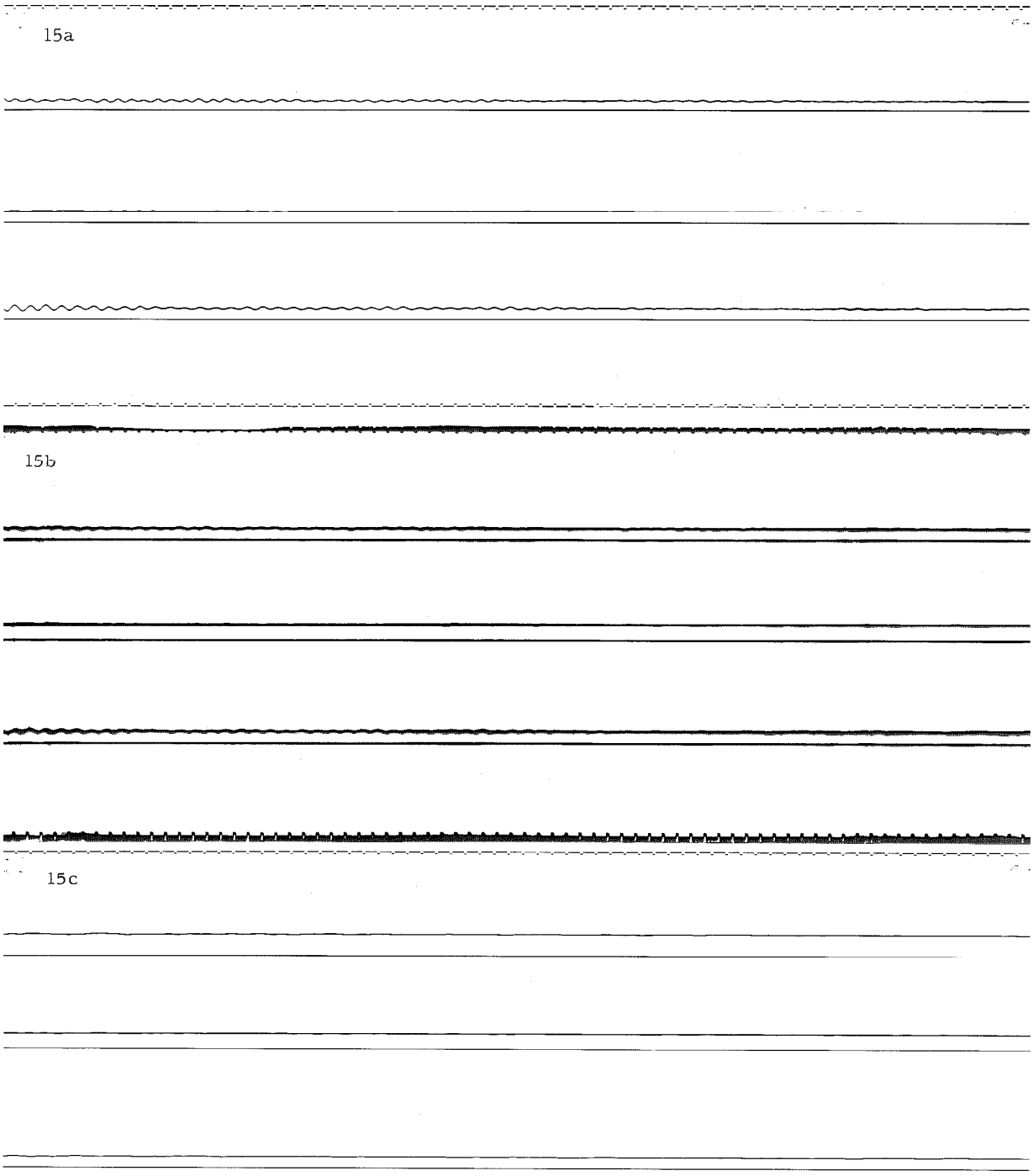

U.S. COAST AND GEODETIC SURVEY
STRONG MOTION SEISMOGRAPH REPORT
LOS ANGELES- USC - VIVIAN HALL - ROOF
EARTHQUAKE OF 8 APRIL 1963 1830 P.S.T.
PENDULUM MOTION N 61 W
PENDULUM MOTION Down
PENDULUM MOTION S 29 W

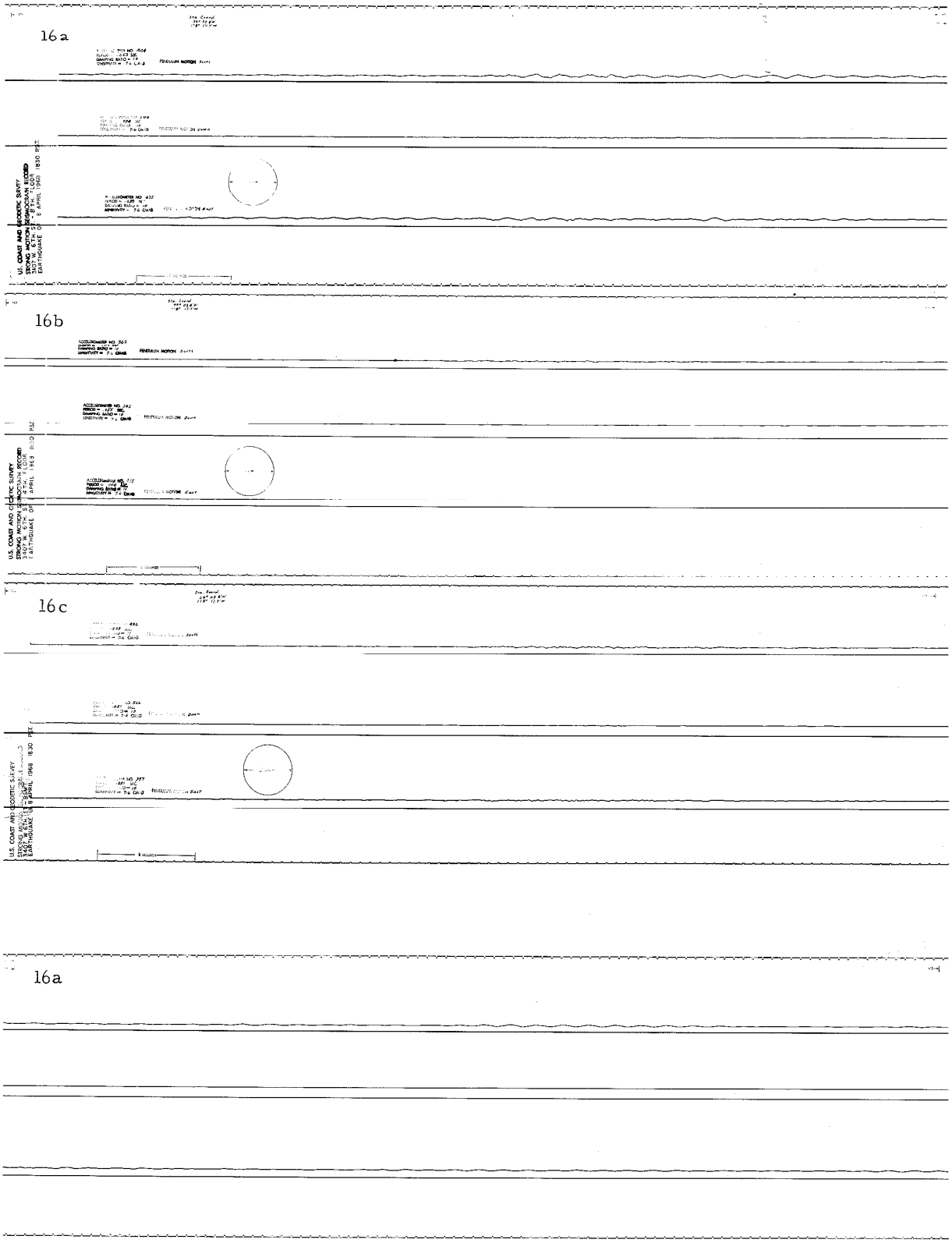
15b


U.S. COAST AND GEODETIC SURVEY
STRONG MOTION SEISMOGRAPH RECORD
LOS ANGELES - USC - VIVIAN HALL - 4TH FLOOR
EARTHQUAKE OF 8 APRIL 1918 1830 PST
PENDULUM MOTION N 61 W
PENDULUM MOTION Down
PENDULUM MOTION S 29 W

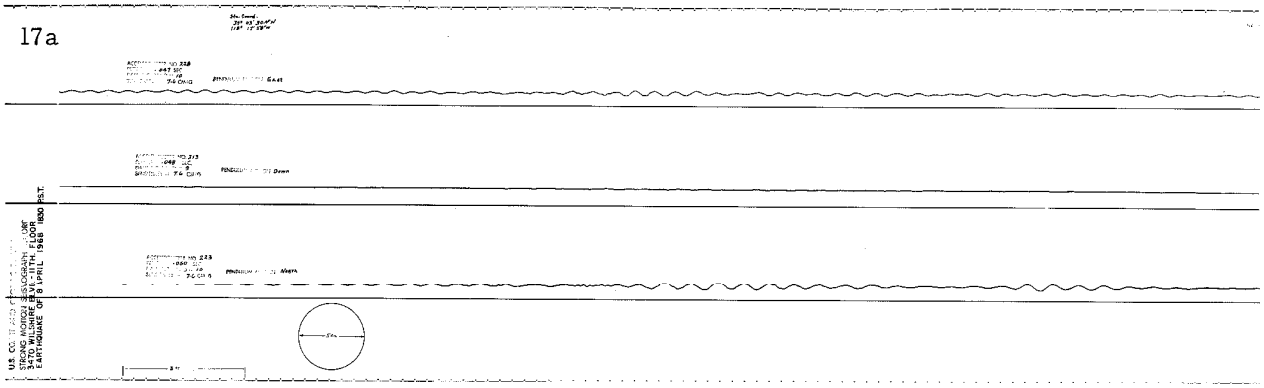
15c


COAST AND GEODETIC SURVEY
STRONG MOTION SEISMOGRAPH RECORD
LOS ANGELES - USC - VIVIAN HALL - BASEMENT
EARTHQUAKE OF 8 APRIL 1963 1830 PST.
PENDULUM MOTION N 61 W
PENDULUM MOTION S 29 W

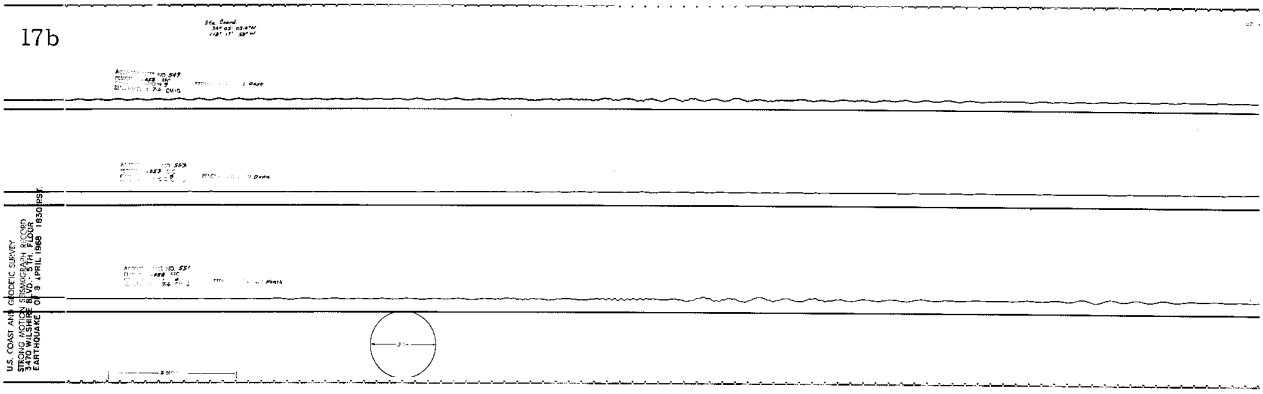

15a
15b
15c


16a
16b
16c
16a

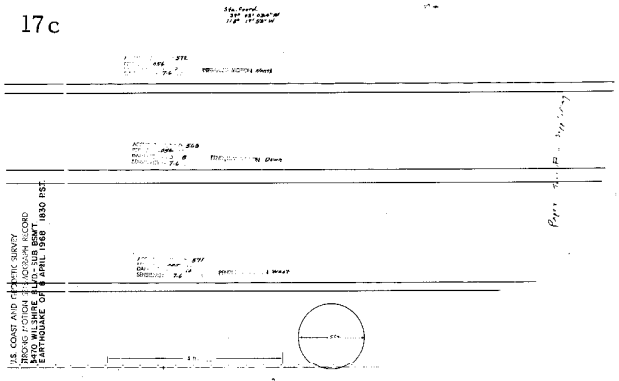
17a

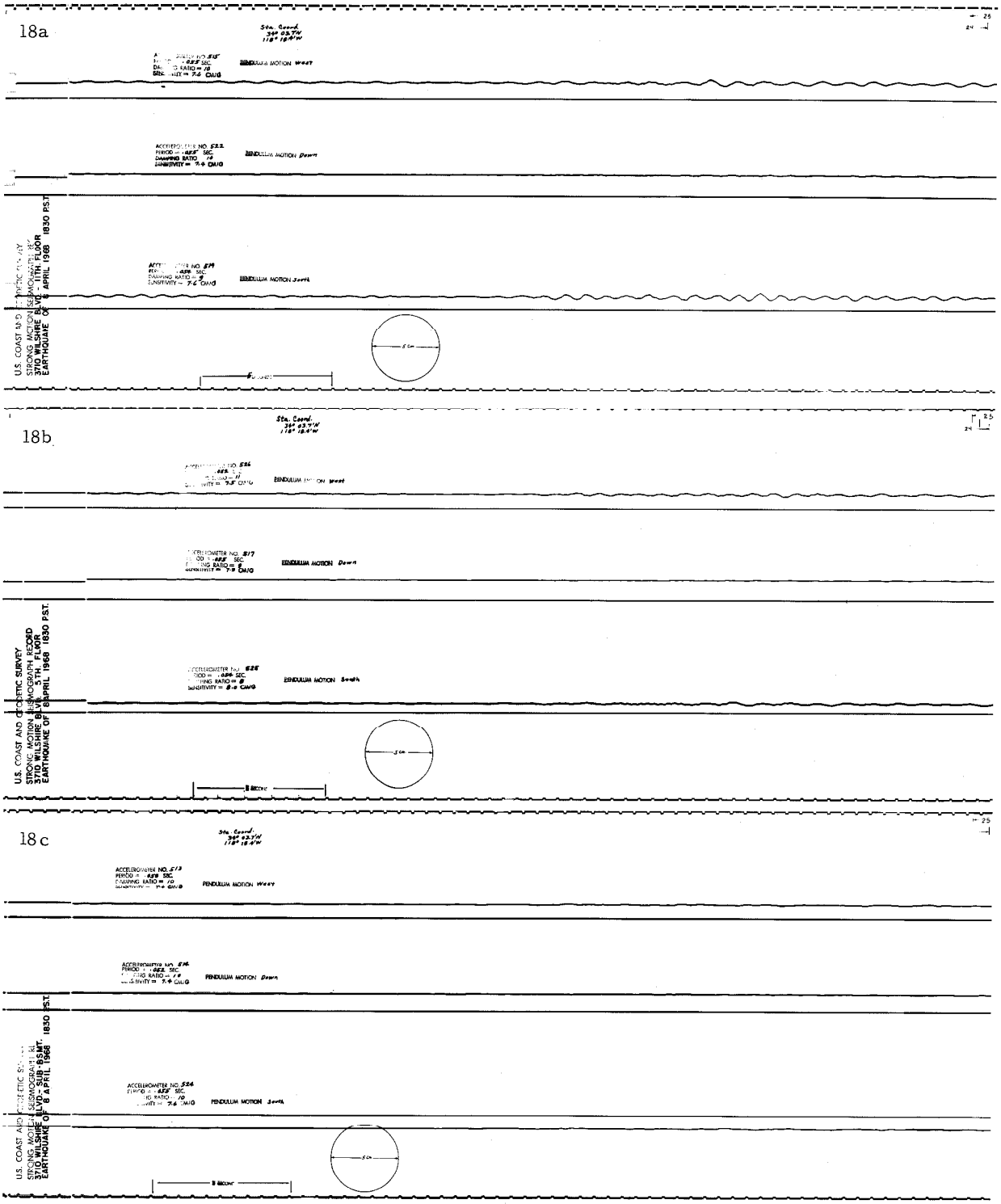


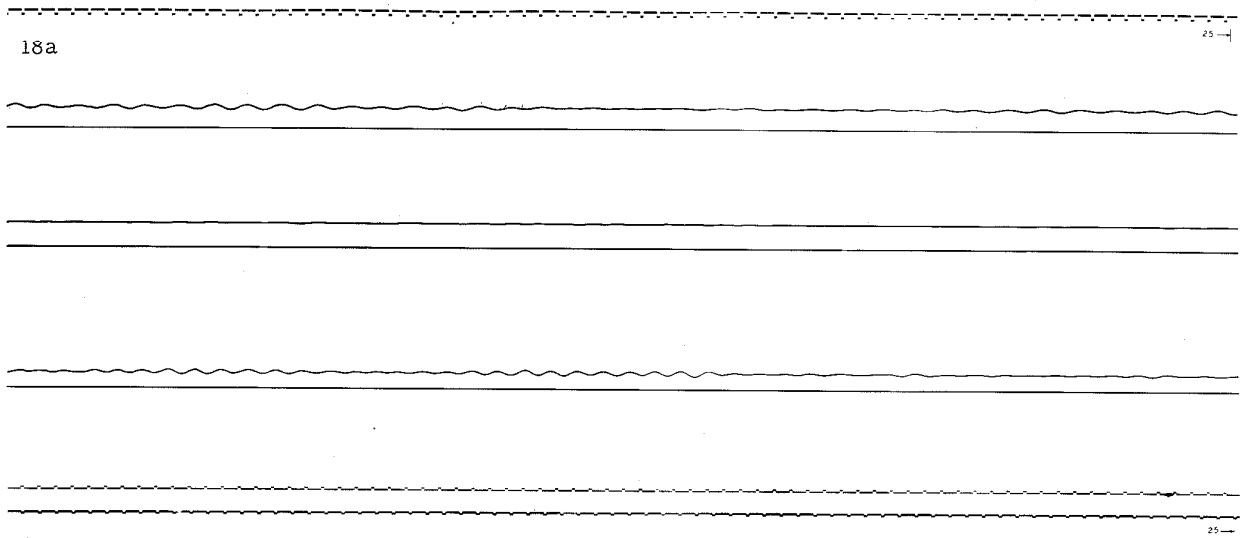
17b



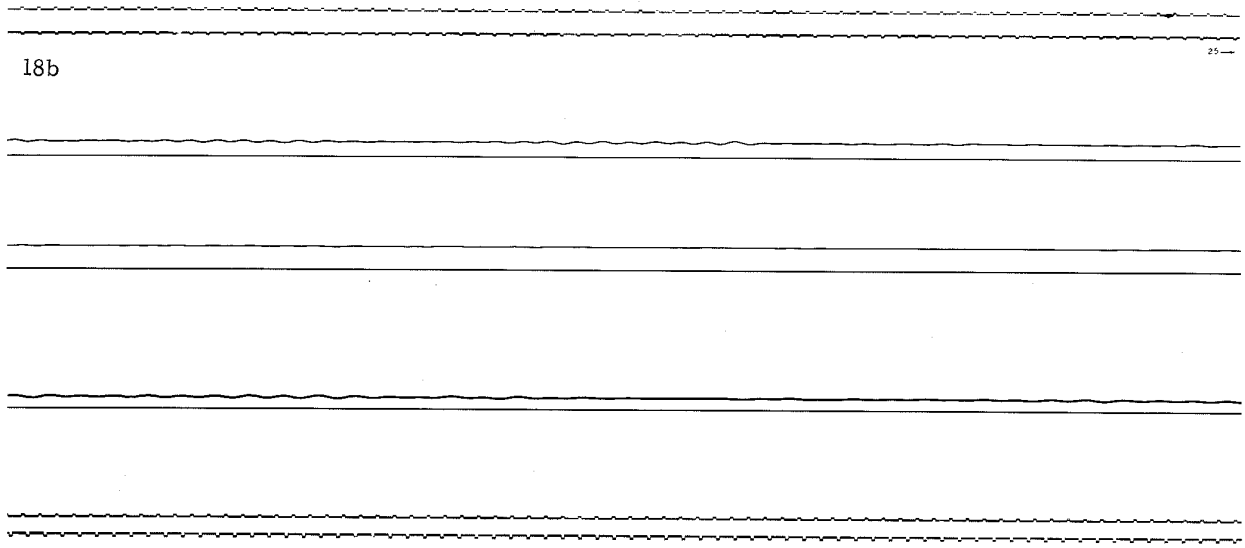
17c



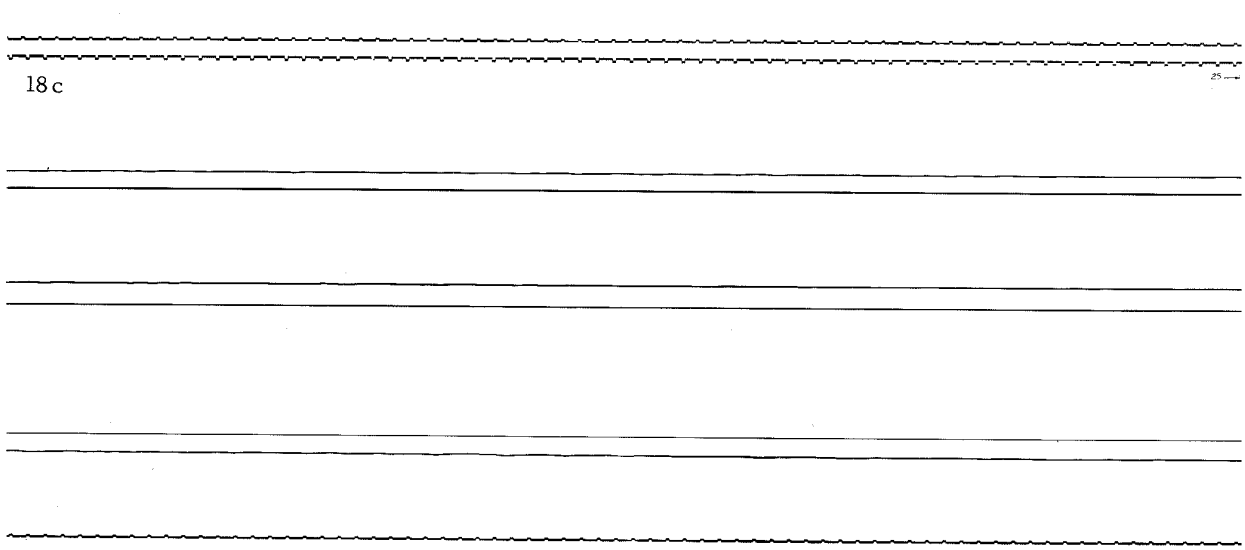

18a
Sta. Coord.
34° 03.7'N
118° 18.6'W
PENDULUM MOTION West
PENDULUM MOTION Down
PENDULUM MOTION South
U.S. COAST AND GEODETIC SURVEY
STRONG MOTION SEISMOGRAPH RECORD
18b
Sta. Coord.
34° 03.7'N
118° 18.6'W
PENDULUM MOTION West
PENDULUM MOTION Down
PENDULUM MOTION South
U.S. COAST AND GEODETIC SURVEY
STRONG MOTION SEISMOGRAPH RECORD
18c
Sta. Coord.
34° 03.7'N
118° 18.6'W
PENDULUM MOTION West
PENDULUM MOTION Down
PENDULUM MOTION South
U.S. COAST AND GEODETIC SURVEY
STRONG MOTION SEISMOGRAPH RECORD



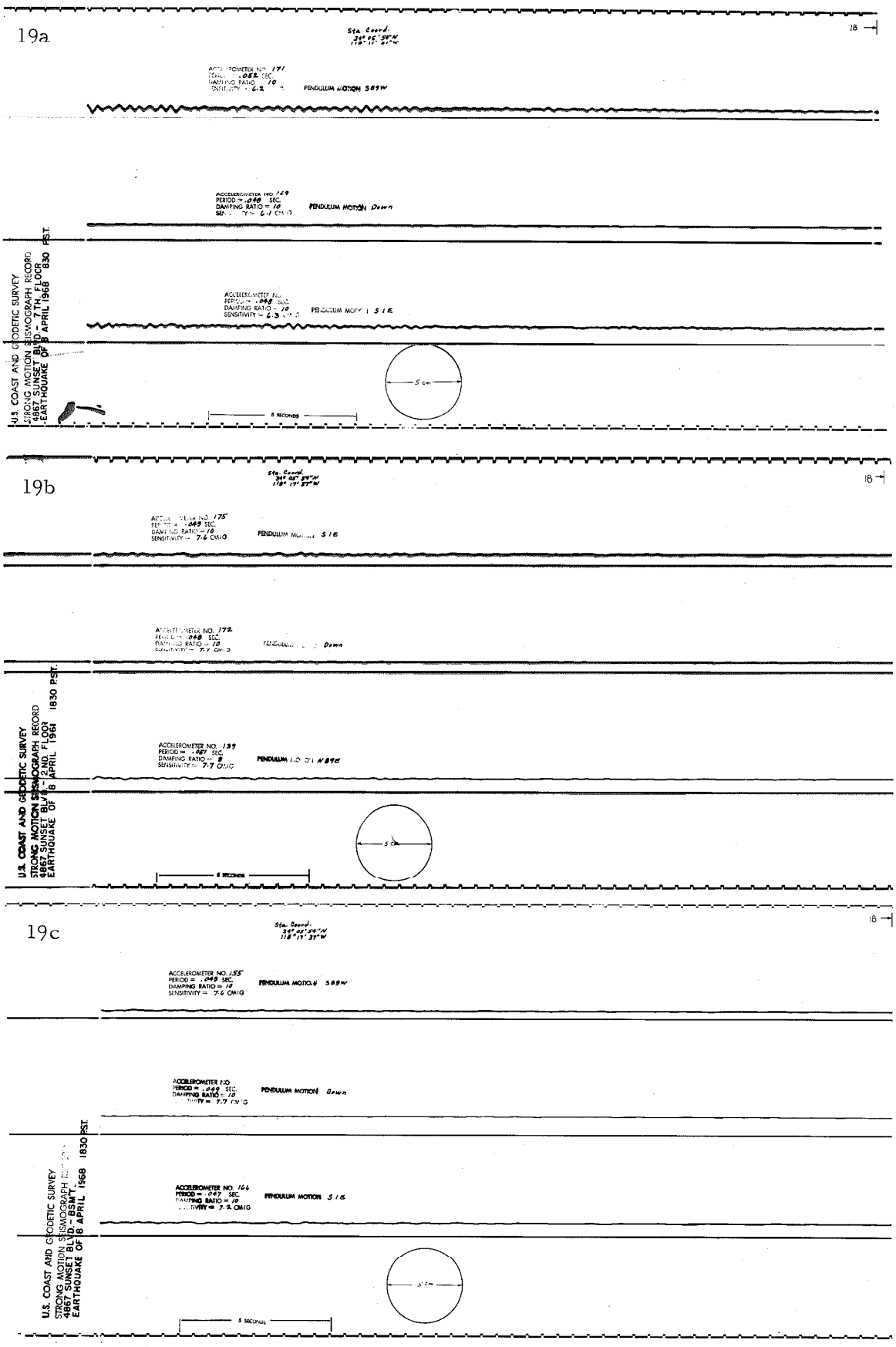
18a



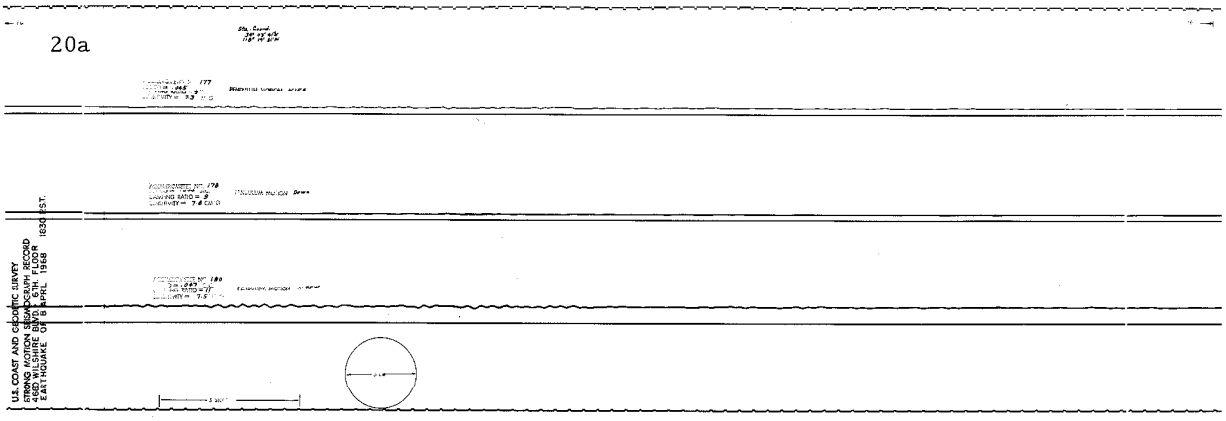
18b



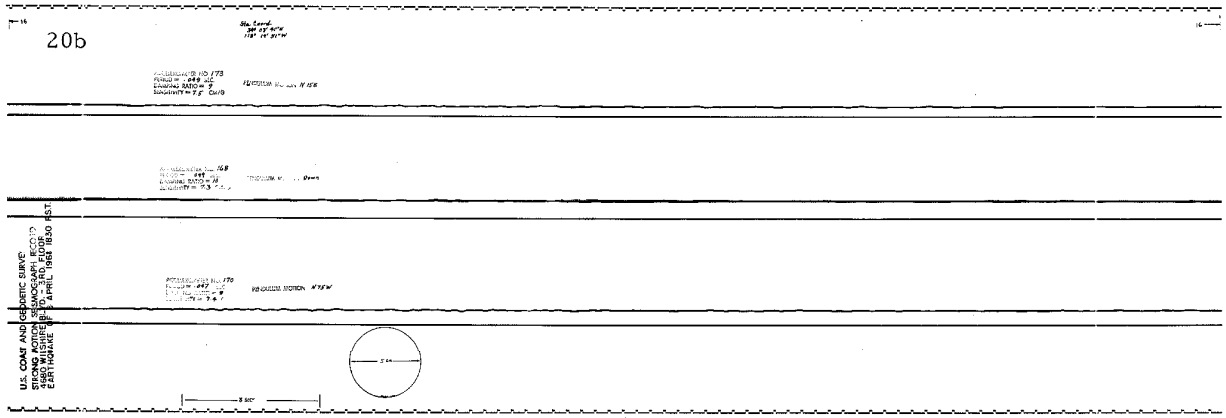
18c


19a
Sta. Coord.
34° 05' 58"N
118° 17' 31"W
18
ACCELEROMETER NO. 171
PERIOD = .052 SEC.
DAMPING RATIO = .10
SENSITIVITY = 6.2
PENDULUM MOTION S89W
ACCELEROMETER NO. 149
PERIOD = .048 SEC.
DAMPING RATIO = 10
PENDULUM MOTION Down
ACCELEROMETER NO.
PERIOD = .048 SEC.
DAMPING RATIO = 10
SENSITIVITY = 6.3
PENDULUM MOTION S 1E
U.S. COAST AND GEODETIC SURVEY
STRONG MOTION SEISMOGRAPH RECORD
4867 SUNSET BLVD - 7TH FLOOR
EARTHQUAKE OF 8 APRIL 1968 1830 PST.
5 cm
5 SECONDS
19b
Sta. Coord.
34° 05' 58"N
118° 17' 31"W
18
ACCELEROMETER NO. 175
PERIOD = .049 SEC.
DAMPING RATIO = 10
SENSITIVITY = 7.6 CM/G
PENDULUM MOTION S 1E
ACCELEROMETER NO. 172
PERIOD = .048 SEC.
DAMPING RATIO = 10
PENDULUM MOTION Down
ACCELEROMETER NO. 139
PERIOD = .047 SEC.
DAMPING RATIO = 9
SENSITIVITY = 7.7 CM/G
PENDULUM MOTION N89E
U.S. COAST AND GEODETIC SURVEY
STRONG MOTION SEISMOGRAPH RECORD
4867 SUNSET BLVD - 7TH FLOOR
EARTHQUAKE OF 8 APRIL 1968 1830 PST.
5 cm
5 SECONDS
19c
Sta. Coord.
34° 05' 58"N
118° 17' 31"W
18
ACCELEROMETER NO. 155
PERIOD = .049 SEC.
DAMPING RATIO = 10
SENSITIVITY = 7.6 CM/G
PENDULUM MOTION S89W
ACCELEROMETER NO.
PERIOD = .049 SEC.
DAMPING RATIO = 10
SENSITIVITY = 7.7 CM/G
PENDULUM MOTION Down
ACCELEROMETER NO. 166
PERIOD = .047 SEC.
DAMPING RATIO = 10
SENSITIVITY = 7.2 CM/G
PENDULUM MOTION S 1E
U.S. COAST AND GEODETIC SURVEY
STRONG MOTION SEISMOGRAPH RECORD
4867 SUNSET BLVD - BSMT.
EARTHQUAKE OF 8 APRIL 1968 1830 PST.
5 cm
5 SECONDS

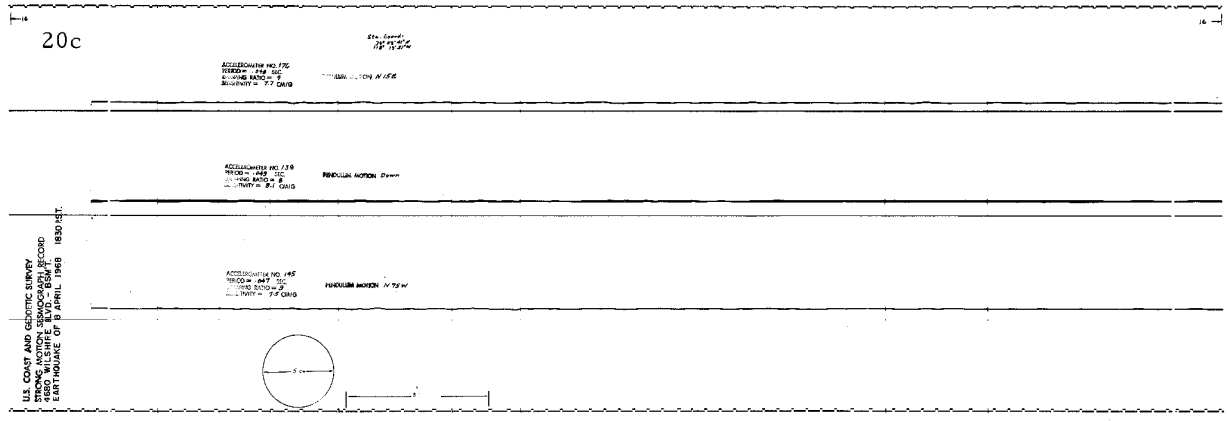
20a

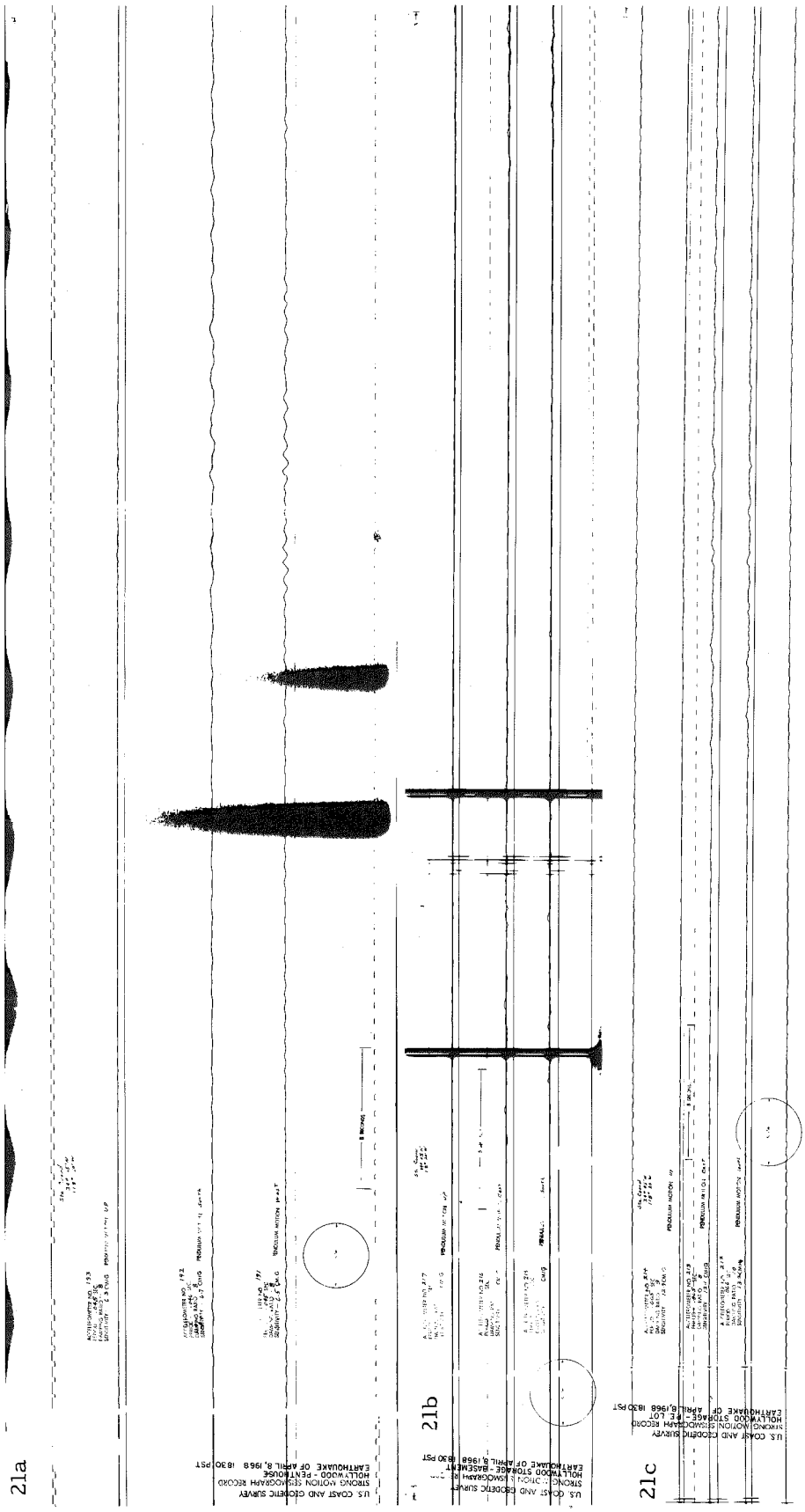

U.S. COAST AND GEODETIC SURVEY
STRONG MOTION SEISMOGRAPH RECORD
4680 WILSHIRE BLVD. L.A. CALIF. 3RD. FLOOR
EARTHQUAKE OF 8 APRIL 1968 1830 PST.

20b

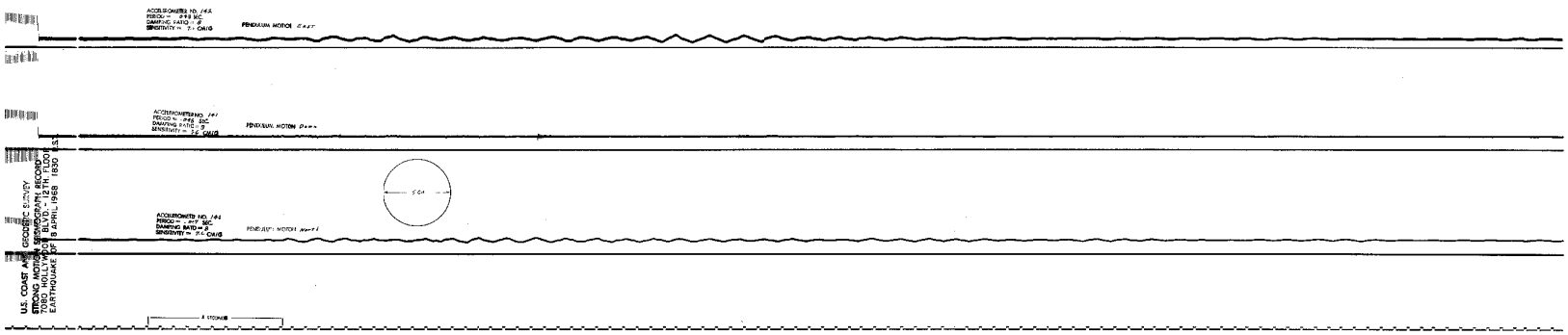

U.S. COAST AND GEODETIC SURVEY
STRONG MOTION SEISMOGRAPH RECORD
4680 WILSHIRE BLVD. L.A. CALIF. 3RD. FLOOR
EARTHQUAKE OF 8 APRIL 1968 1830 PST.

20c

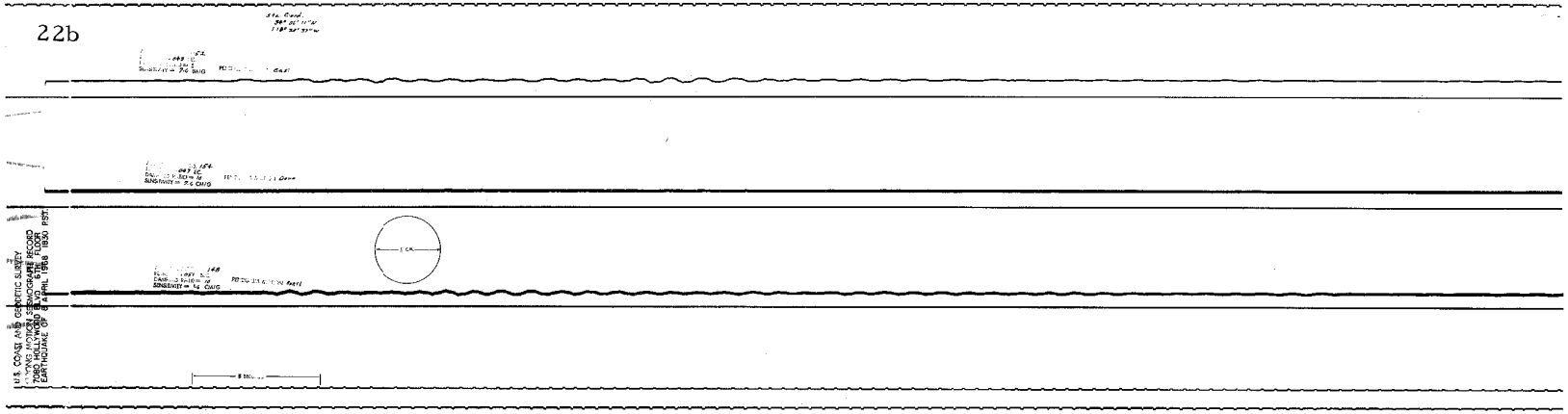

U.S. COAST AND GEODETIC SURVEY
STRONG MOTION SEISMOGRAPH RECORD
4680 WILSHIRE BLVD. L.A. CALIF. 3RD. FLOOR
EARTHQUAKE OF 8 APRIL 1968 1830 PST.


21a
21b
21c

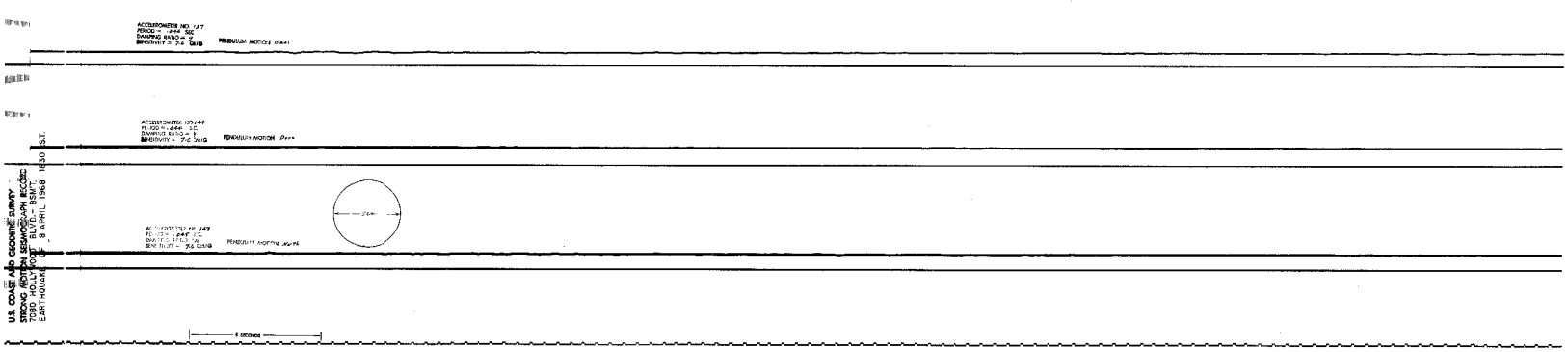
22a

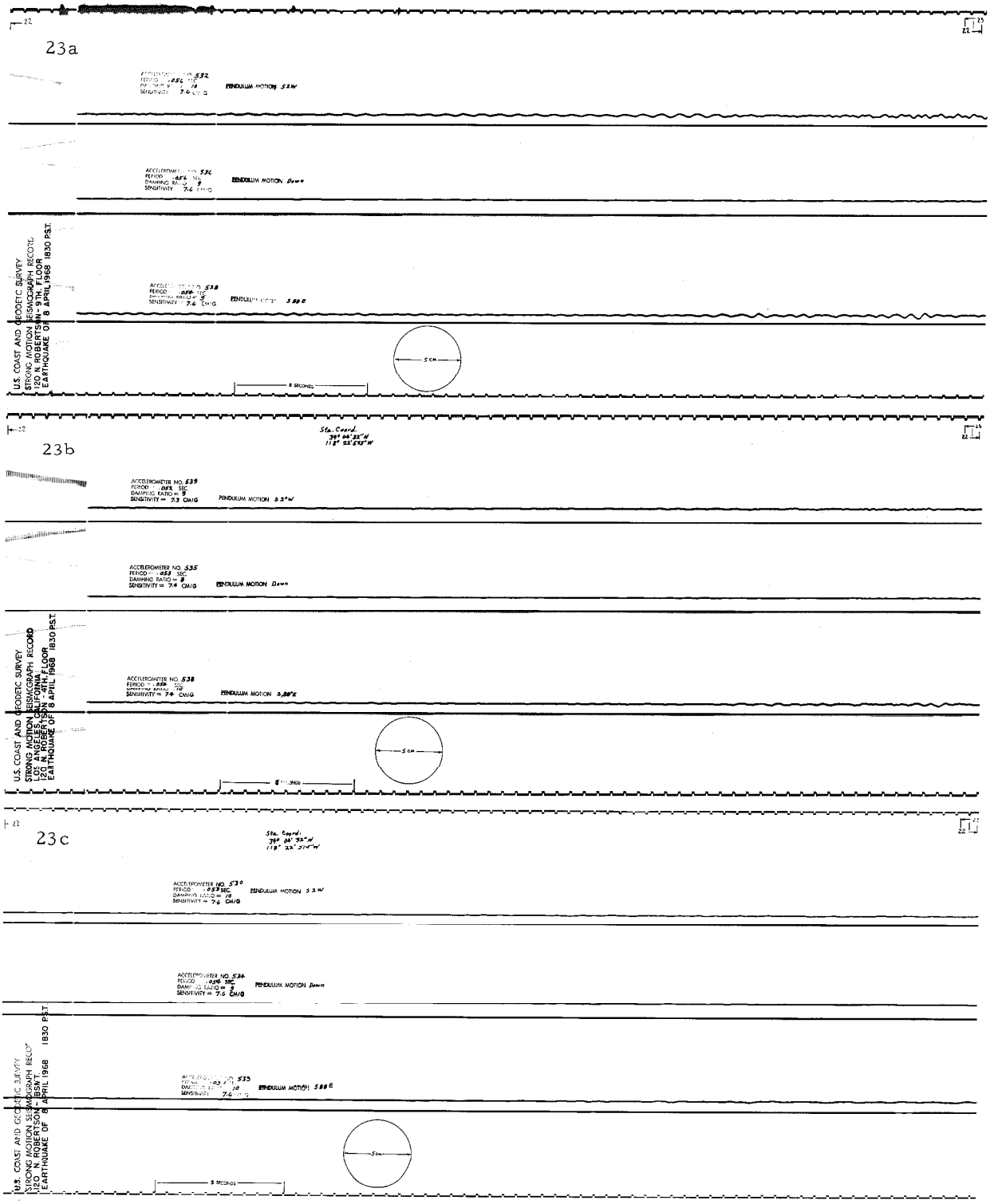

U.S. COAST AND GEODETIC SURVEY
STRONG MOTION SEISMOGRAPH RECORD
7080 HOLLYWOOD BLVD. - 12TH. FLOOR
EARTHQUAKE OF 8 APRIL 1968 1830 PST.
PENDULUM MOTION East
PENDULUM MOTION North
1 SECOND

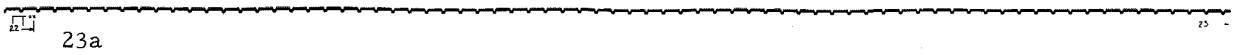
22b


U.S. COAST AND GEODETIC SURVEY
STRONG MOTION SEISMOGRAPH RECORD
7080 HOLLYWOOD BLVD. - 6TH. FLOOR
EARTHQUAKE OF 8 APRIL 1968 1830 PST.

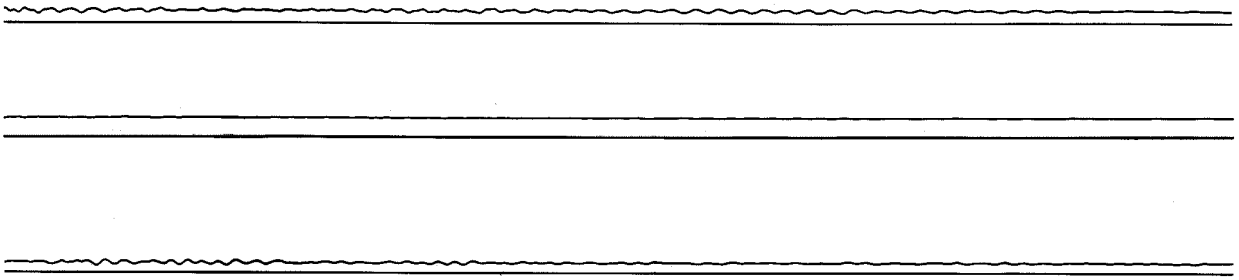
22c

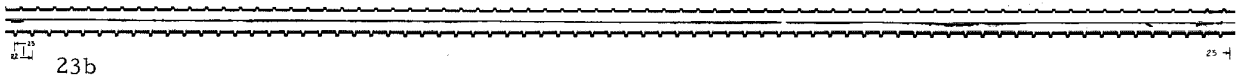

U.S. COAST AND GEODETIC SURVEY
STRONG MOTION SEISMOGRAPH RECORD
7080 HOLLYWOOD BLVD. - BSMT.
EARTHQUAKE OF 8 APRIL 1968 1830 PST.
PENDULUM MOTION East
PENDULUM MOTION North
1 SECOND


23a
PENDULUM MOTION S 2 W
PENDULUM MOTION Down
PENDULUM MOTION S 88 E
U.S. COAST AND GEODETIC SURVEY
STRONG MOTION SEISMOGRAPH RECORD
LOS ANGELES, CALIFORNIA - 4TH. FLOOR
120 N. ROBERTSON - 4TH. FLOOR
EARTHQUAKE OF 8 APRIL 1968 1830 P.S.T.
5 cm
5 SECONDS
23b
Sta. Coord.
34° 04' 22" N
118° 22' 52" W
ACCELEROMETER NO. 539
PERIOD = .093 SEC.
DAMPING RATIO = 9
SENSITIVITY = 7.3 CM/G
PENDULUM MOTION S 2° W
ACCELEROMETER NO. 535
PERIOD = .093 SEC.
DAMPING RATIO = 9
SENSITIVITY = 7.4 CM/G
PENDULUM MOTION Down
ACCELEROMETER NO. 538
PERIOD = .098 SEC.
DAMPING RATIO = 10
SENSITIVITY = 7.4 CM/G
PENDULUM MOTION S 88° E
U.S. COAST AND GEODETIC SURVEY
STRONG MOTION SEISMOGRAPH RECORD
LOS ANGELES, CALIFORNIA - 4TH. FLOOR
120 N. ROBERTSON - 4TH. FLOOR
EARTHQUAKE OF 8 APRIL 1968 1830 P.S.T.
5 cm
5 SECONDS
23c
Sta. Coord.
34° 04' 22" N
118° 22' 51" W
ACCELEROMETER NO. 530
PERIOD = .093 SEC.
DAMPING RATIO = 10
SENSITIVITY = 7.6 CM/G
PENDULUM MOTION S 2 W
ACCELEROMETER NO. 534
PERIOD = .098 SEC.
DAMPING RATIO = 9
SENSITIVITY = 7.6 CM/G
PENDULUM MOTION Down
ACCELEROMETER NO. 535
PERIOD = .093 SEC.
DAMPING RATIO = 10
SENSITIVITY = 7.6 CM/G
PENDULUM MOTION S 88 E
U.S. COAST AND GEODETIC SURVEY
STRONG MOTION SEISMOGRAPH RECORD
LOS ANGELES, CALIFORNIA - 4TH. FLOOR
120 N. ROBERTSON - 4TH. FLOOR
EARTHQUAKE OF 8 APRIL 1968 1830 P.S.T.
5 cm
5 SECONDS

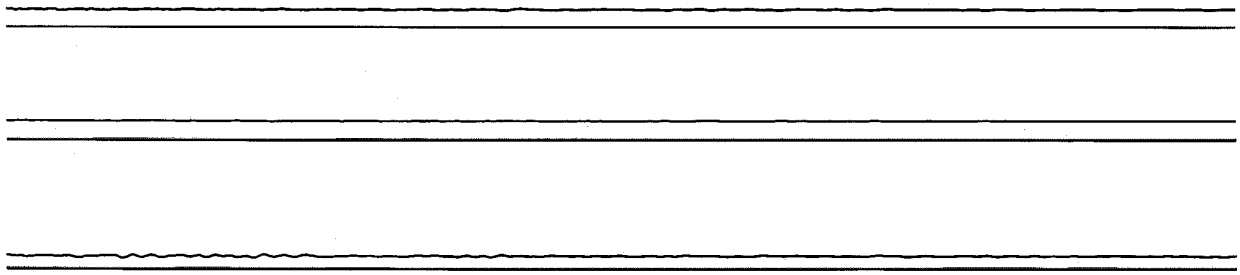


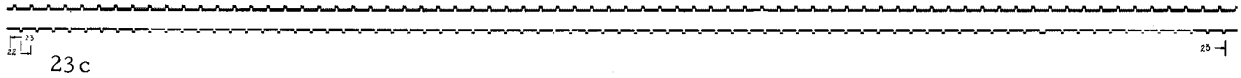
23a



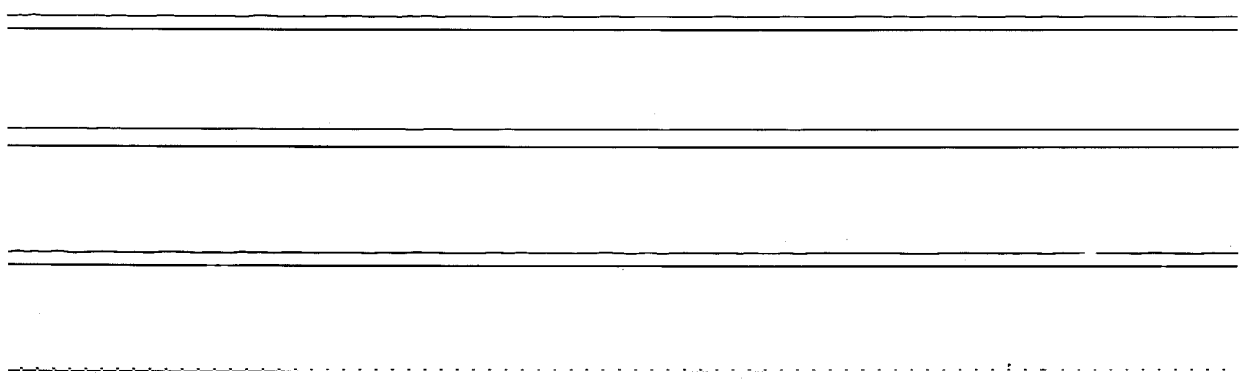


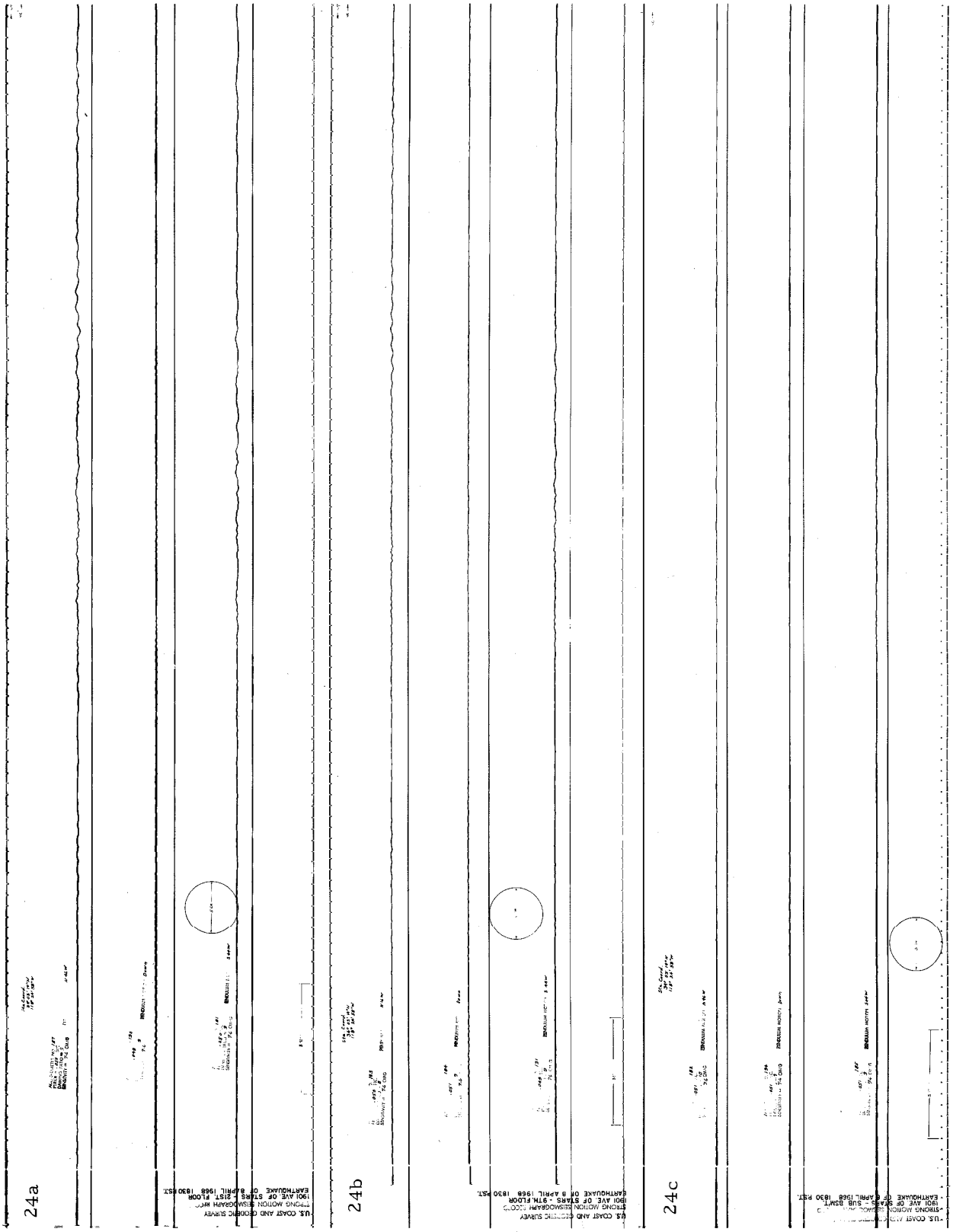
23b

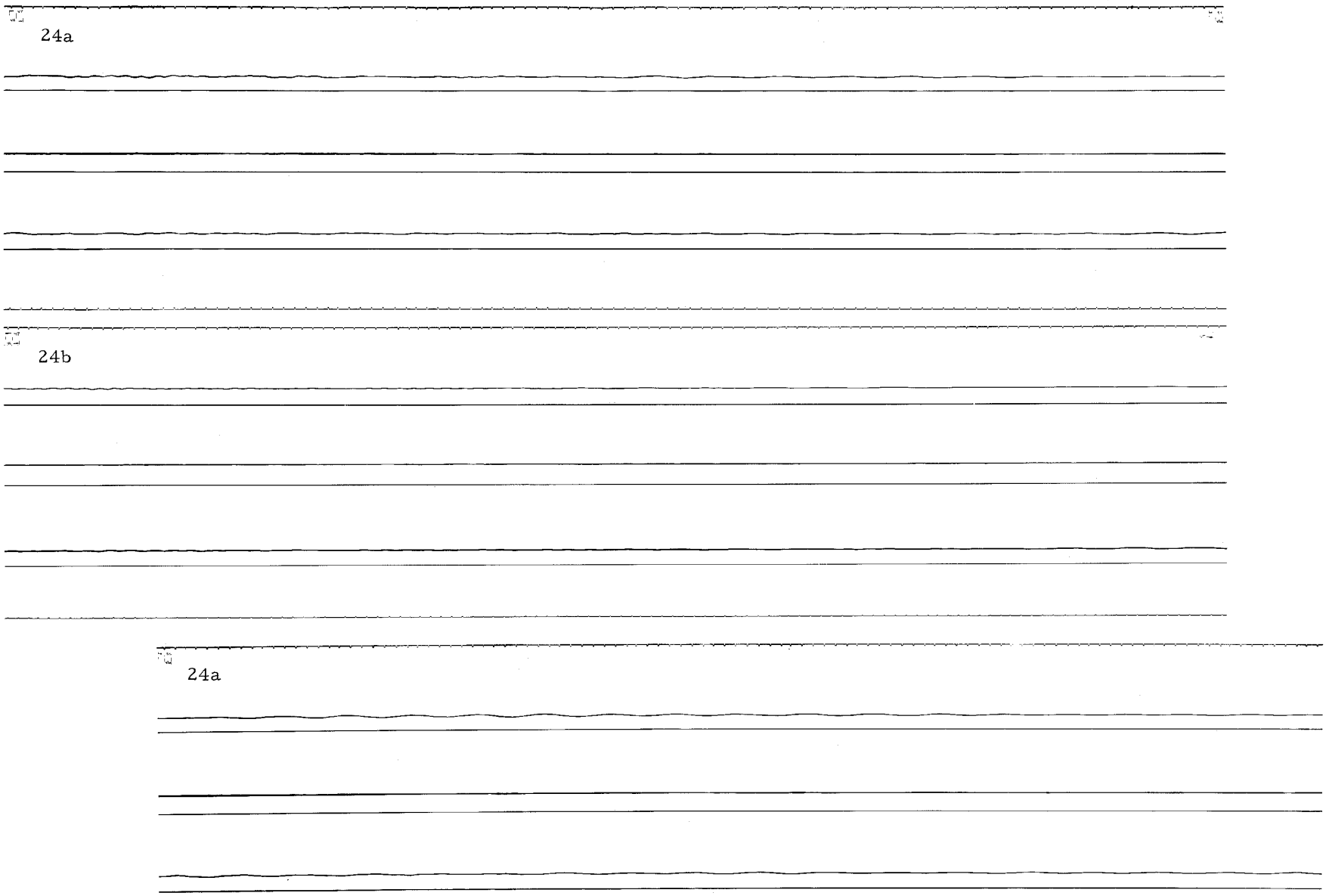


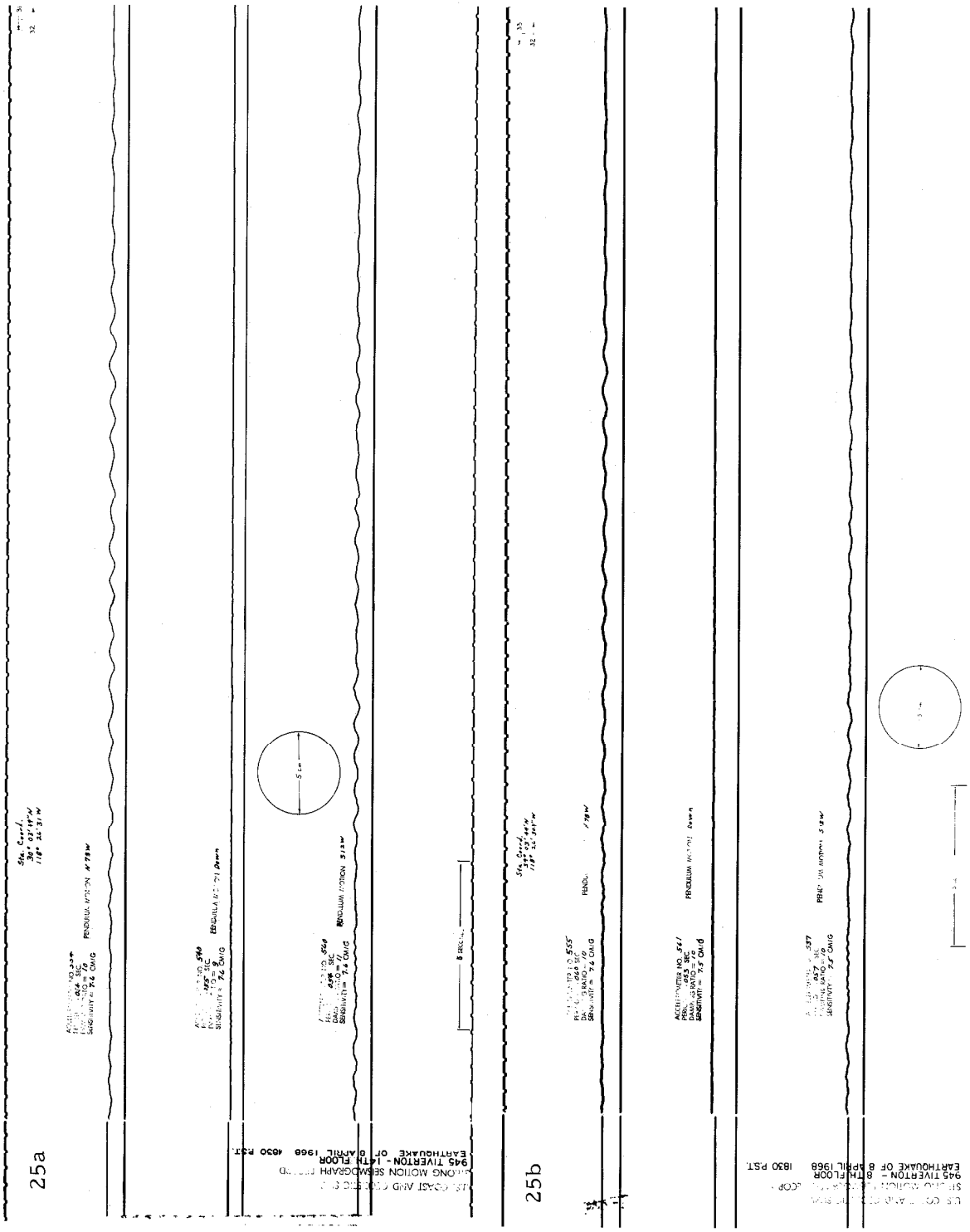


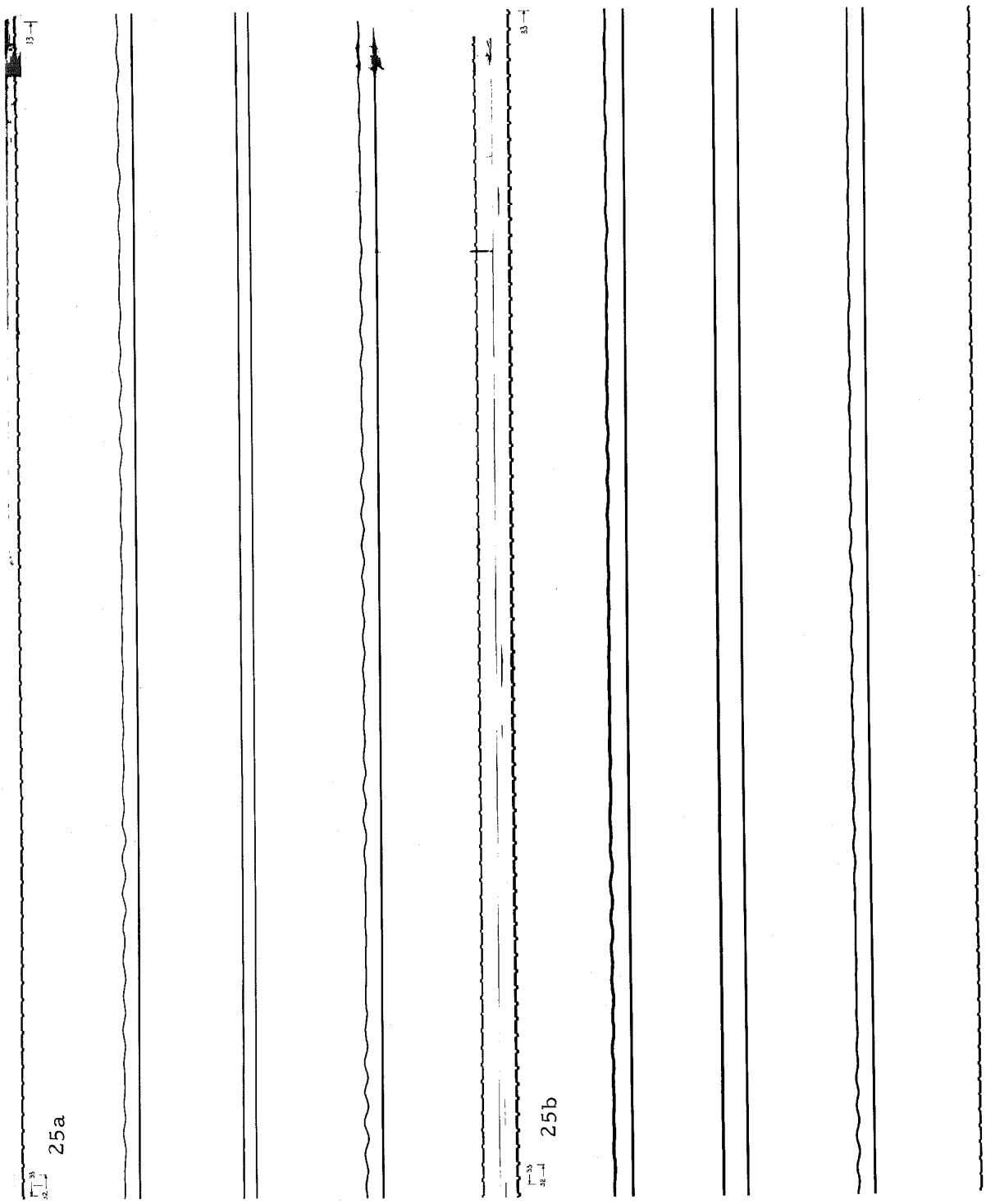
23c




24a
24b
24c

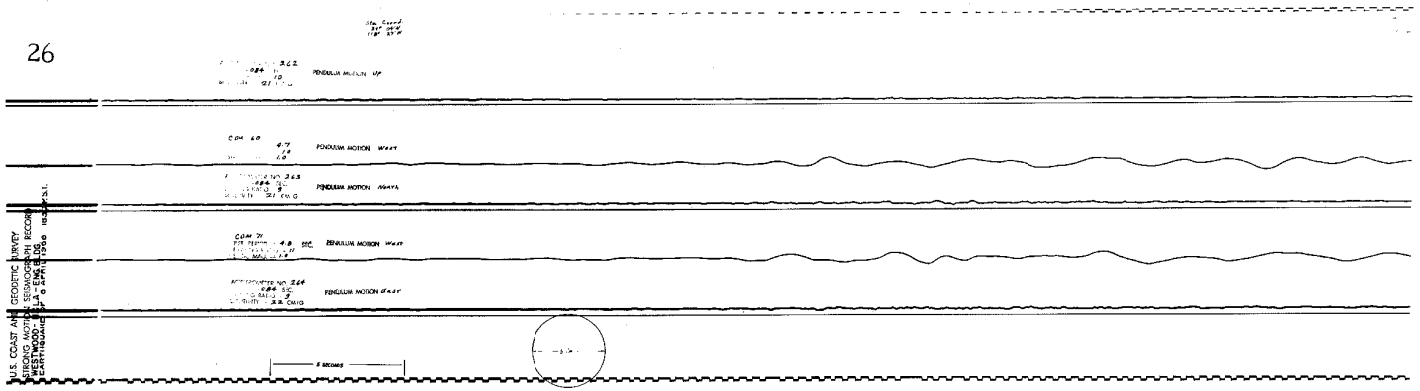

24a
24b
24a


25a
945 TIVERTON - 14TH FLOOR
EARTHQUAKE OF 9 APRIL 1968 4630 PST
25b
945 TIVERTON - 8TH FLOOR
EARTHQUAKE OF 9 APRIL 1968 1830 PST

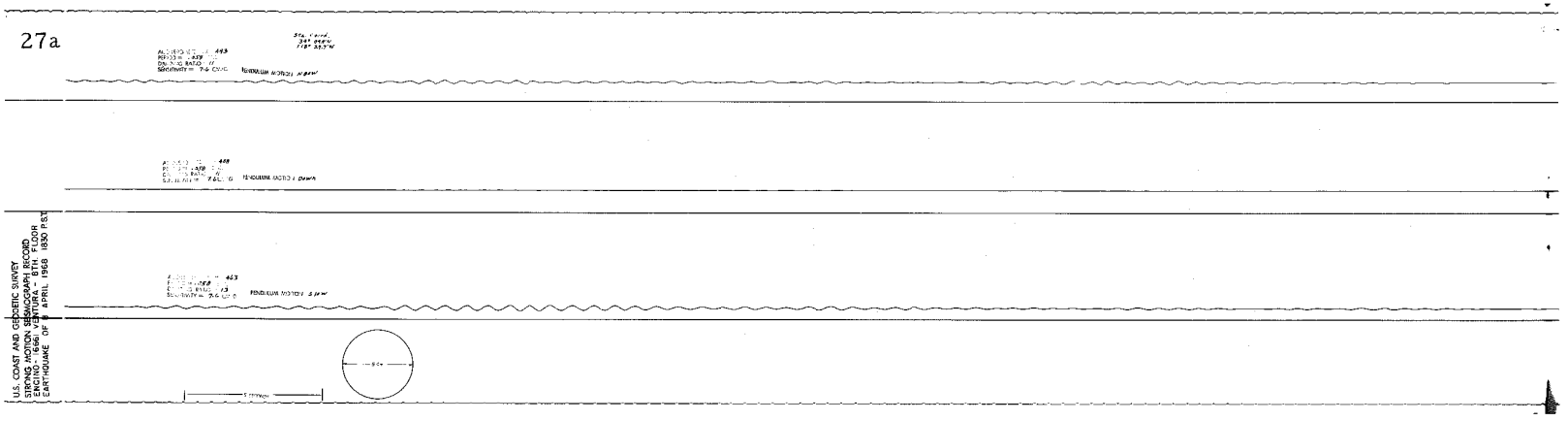


25a

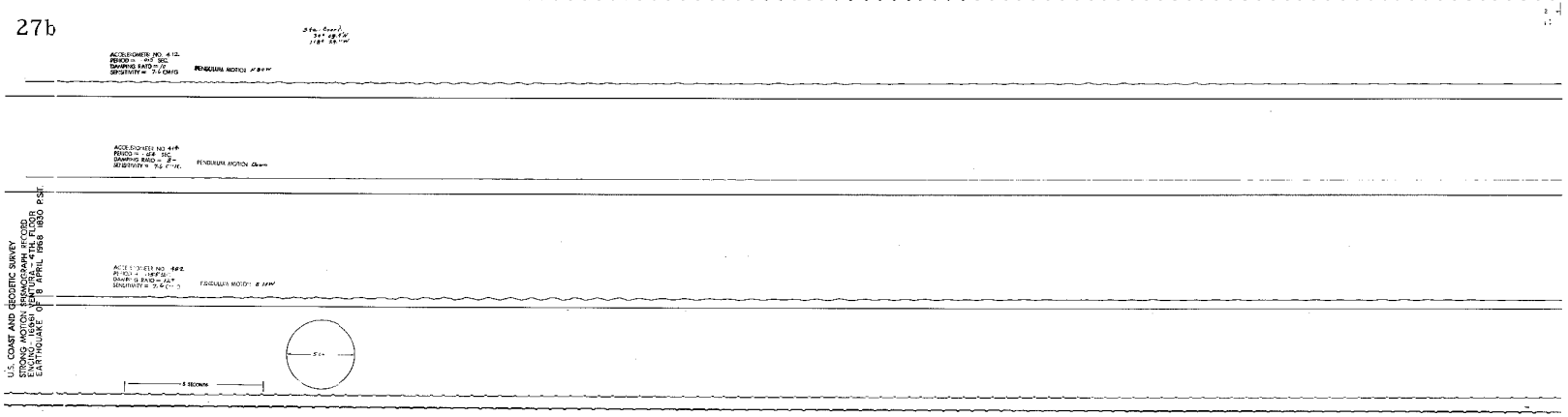
25b


26
PENDULUM MOTION WEST
PENDULUM MOTION WEST
PENDULUM MOTION WEST
PENDULUM MOTION EAST
5 SECONDS
U.S. COAST AND GEODETIC SURVEY
WESTWOOD
EARTHQUAKE
26

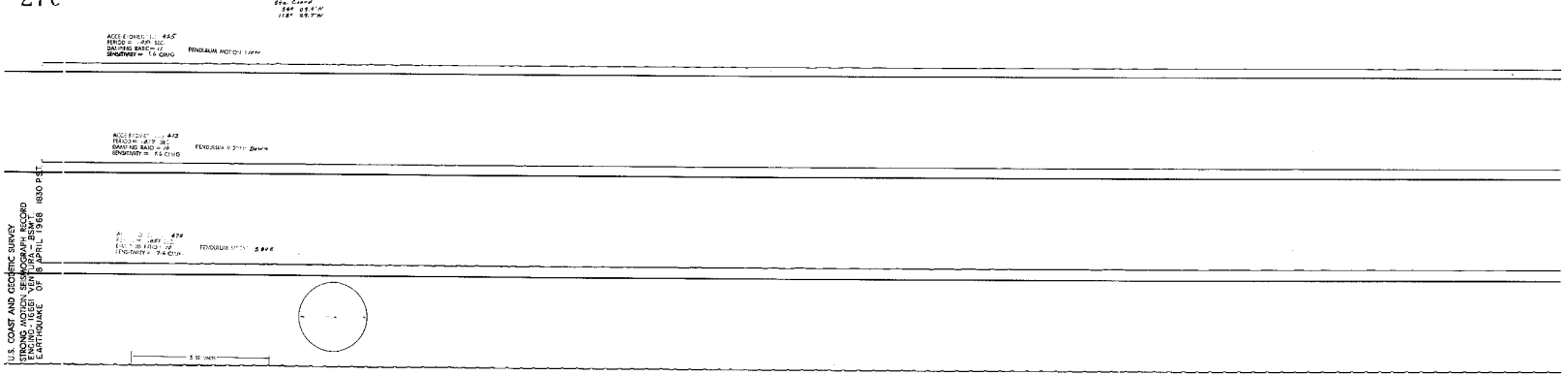
27a


U.S. COAST AND GEODETIC SURVEY
STRONG MOTION SEISMOGRAPH RECORD
ENCINO, 16661 VENTURA—41TH FLOOR
EARTHQUAKE OF 8 APRIL 1968 1830 P.S.T.

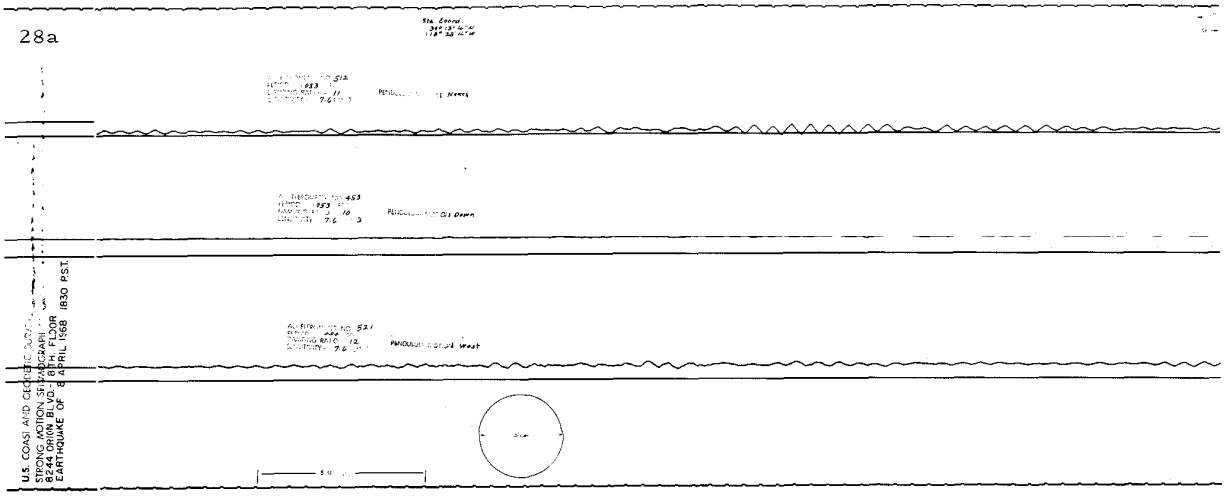
27b


U.S. COAST AND GEODETIC SURVEY
STRONG MOTION SEISMOGRAPH RECORD
ENCINO, 16661 VENTURA—41TH FLOOR
EARTHQUAKE OF 8 APRIL 1968 1830 P.S.T.

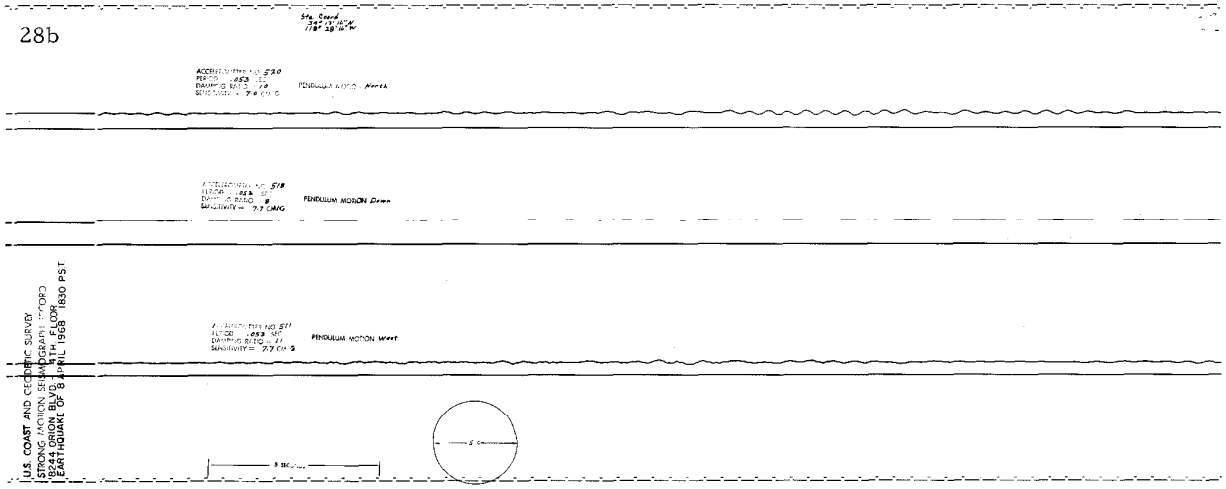
27c


U.S. COAST AND GEODETIC SURVEY
STRONG MOTION SEISMOGRAPH RECORD
ENCINO, 16661 VENTURA—BSMT
EARTHQUAKE OF 8 APRIL 1968 1830 P.S.T.

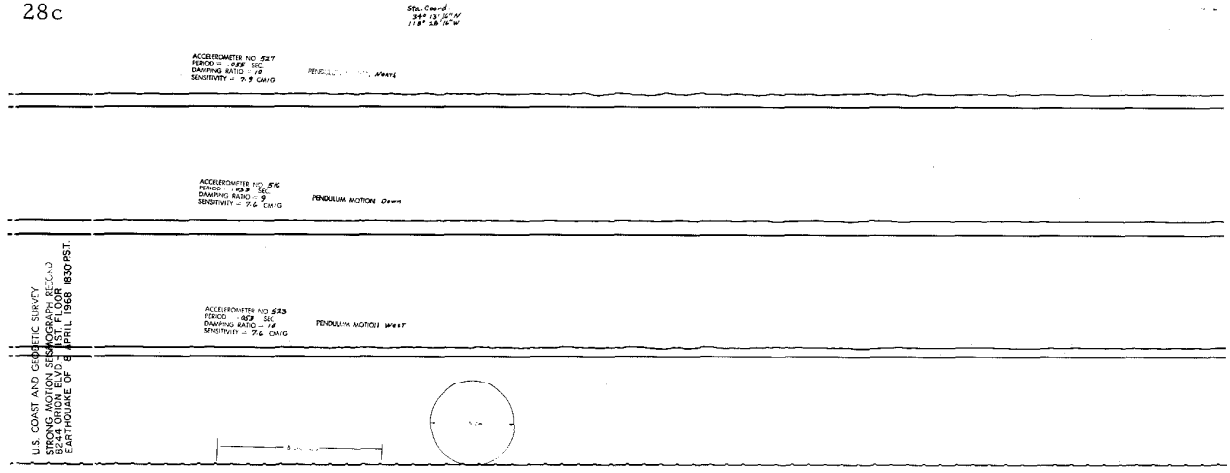
28a


U.S. COAST AND GEODETIC SURVEY
STRONG MOTION SEISMOGRAPH RECORD
8244 ORION BLVD - 1ST FLOOR
EARTHQUAKE OF 8 APRIL 1968 1830 PST.

28b


U.S. COAST AND GEODETIC SURVEY
STRONG MOTION SEISMOGRAPH RECORD
8244 ORION BLVD - 1ST FLOOR
EARTHQUAKE OF 8 APRIL 1968 1830 PST.

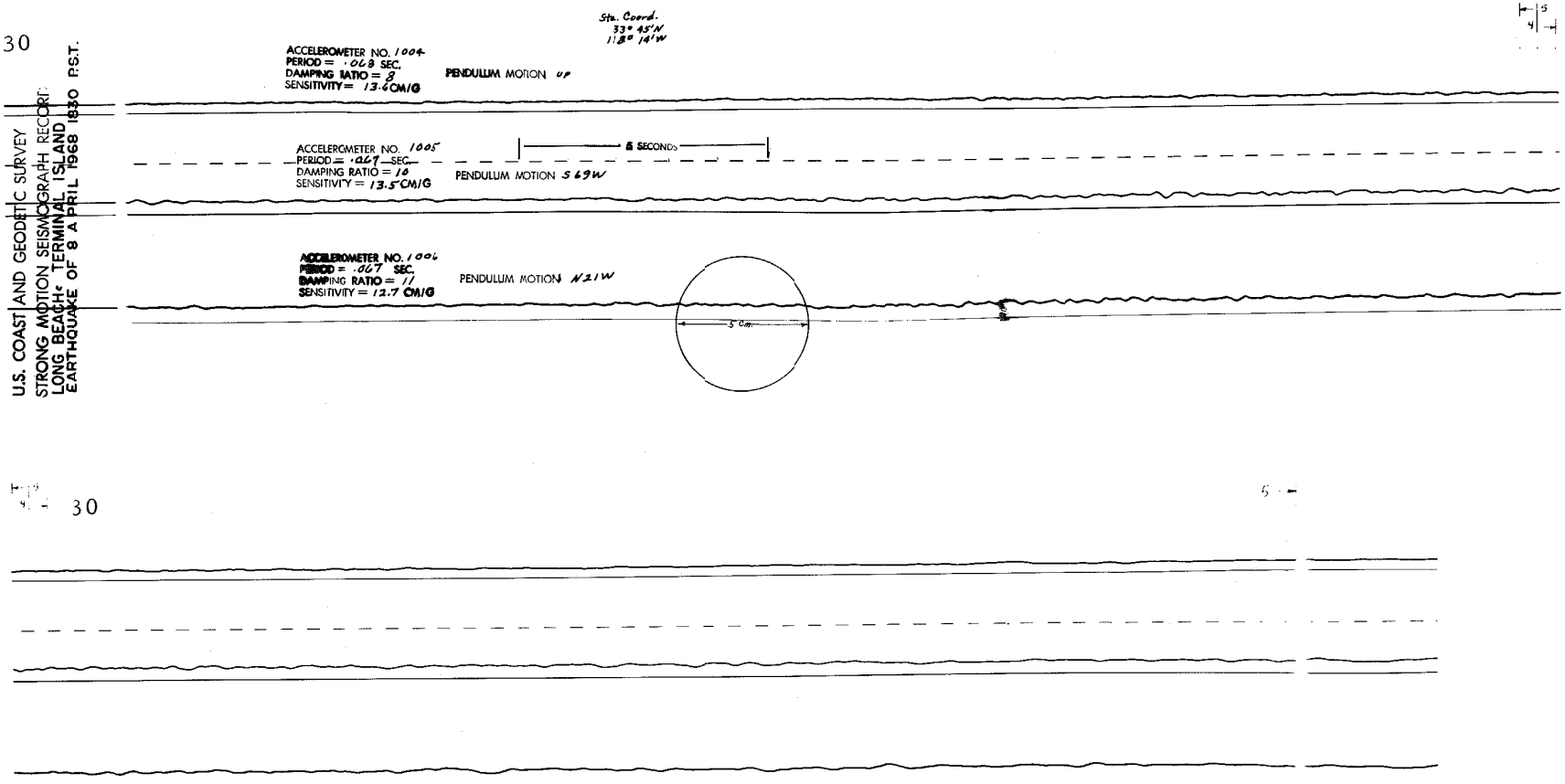
28c


U.S. COAST AND GEODETIC SURVEY
STRONG MOTION SEISMOGRAPH RECORD
8244 ORION BLVD - 1ST FLOOR
EARTHQUAKE OF 8 APRIL 1968 1830 PST.

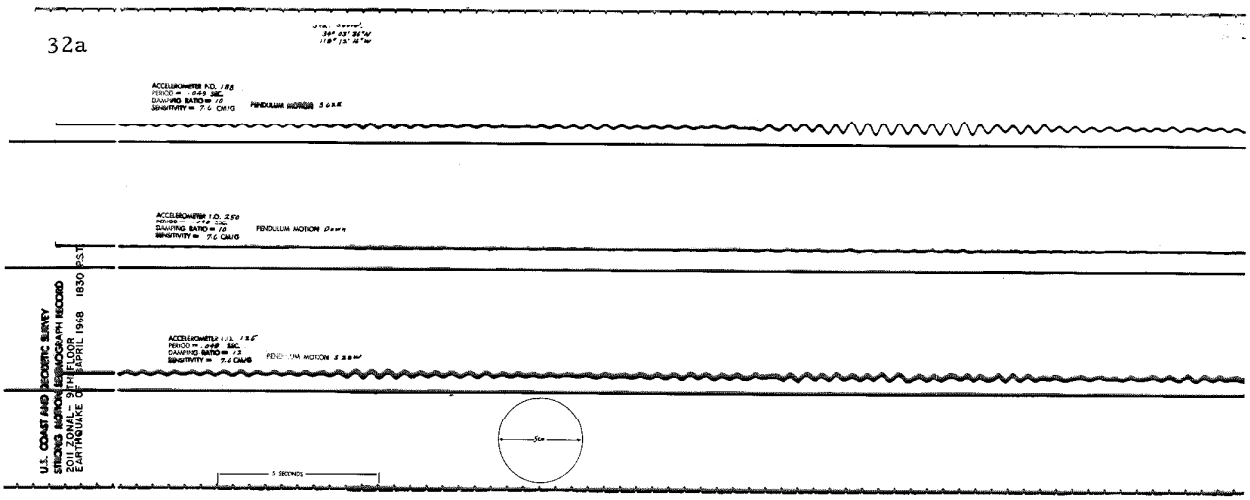
28a

28b

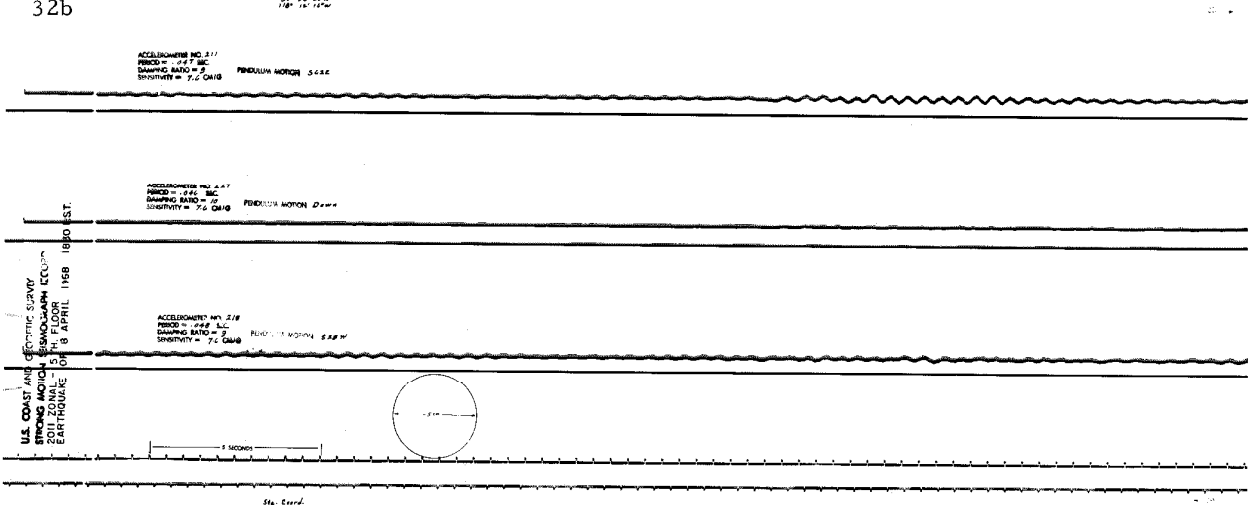
28c


30
U.S. COAST AND GEODETIC SURVEY
STRONG MOTION SEISMOGRAPH RECORD
LONG BEACH, TERMINAL ISLAND
EARTHQUAKE OF 8 APRIL 1968 1830 P.S.T.
Sta. Coord.
33° 45'N
118° 14'W
ACCELEROMETER NO. 1004
PERIOD = .068 SEC.
DAMPING RATIO = 8
SENSITIVITY = 13.6 CM/G
PENDULUM MOTION UP
ACCELEROMETER NO. 1005
PERIOD = .067 SEC.
DAMPING RATIO = 10
SENSITIVITY = 13.5 CM/G
5 SECONDS
PENDULUM MOTION S 69 W
ACCELEROMETER NO. 1006
PERIOD = .067 SEC.
DAMPING RATIO = 11
SENSITIVITY = 12.7 CM/G
PENDULUM MOTION N 21 W
5 cm.
30

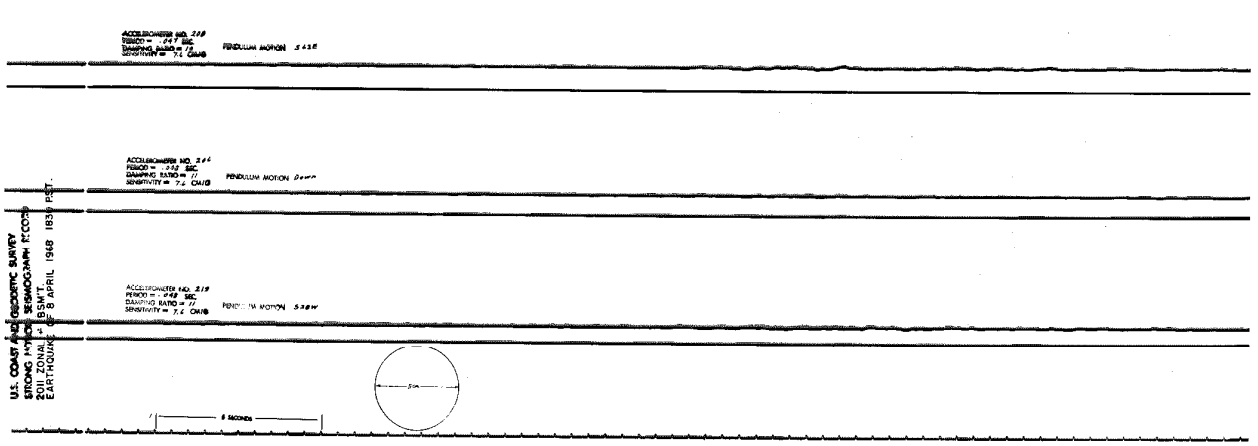
32a


U.S. COAST AND GEODETIC SURVEY
STRONG MOTION SEISMOGRAPH RECORD
2011 ZONAL – 9TH FLOOR
EARTHQUAKE OF 8 APRIL 1968 1830 PST.
PENDULUM MOTION
PENDULUM MOTION Down
5 SECONDS

32b


U.S. COAST AND GEODETIC SURVEY
STRONG MOTION SEISMOGRAPH RECORD
2011 ZONAL – 9TH FLOOR
EARTHQUAKE OF 8 APRIL 1968 1830 PST.
PENDULUM MOTION
PENDULUM MOTION Down
5 SECONDS

32c

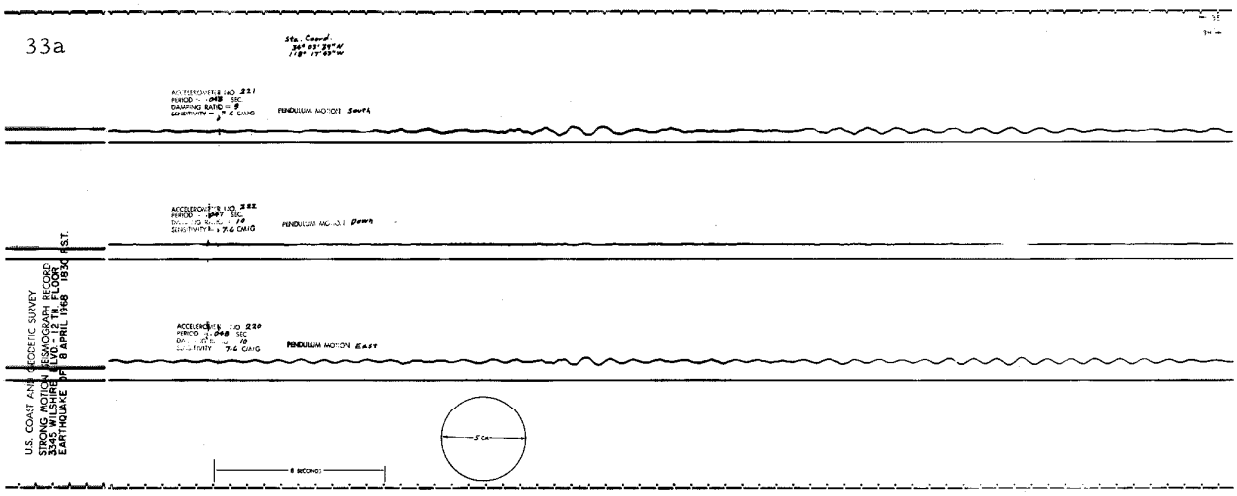

U.S. COAST AND GEODETIC SURVEY
STRONG MOTION SEISMOGRAPH RECORD
2011 ZONAL – 9TH FLOOR
EARTHQUAKE OF 8 APRIL 1968 1830 PST.
PENDULUM MOTION
PENDULUM MOTION Down
5 SECONDS

32a

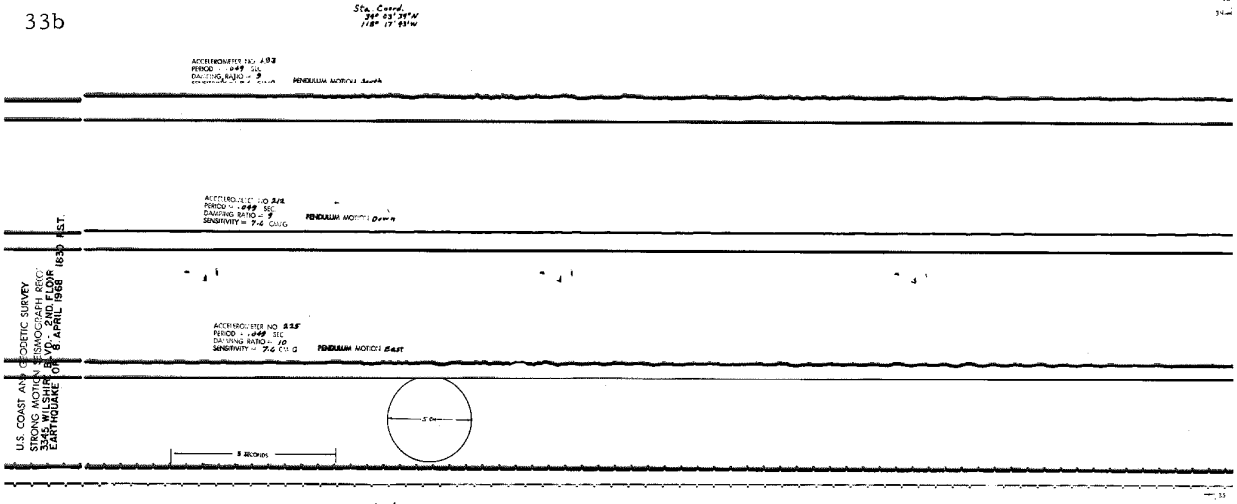
32b

32c

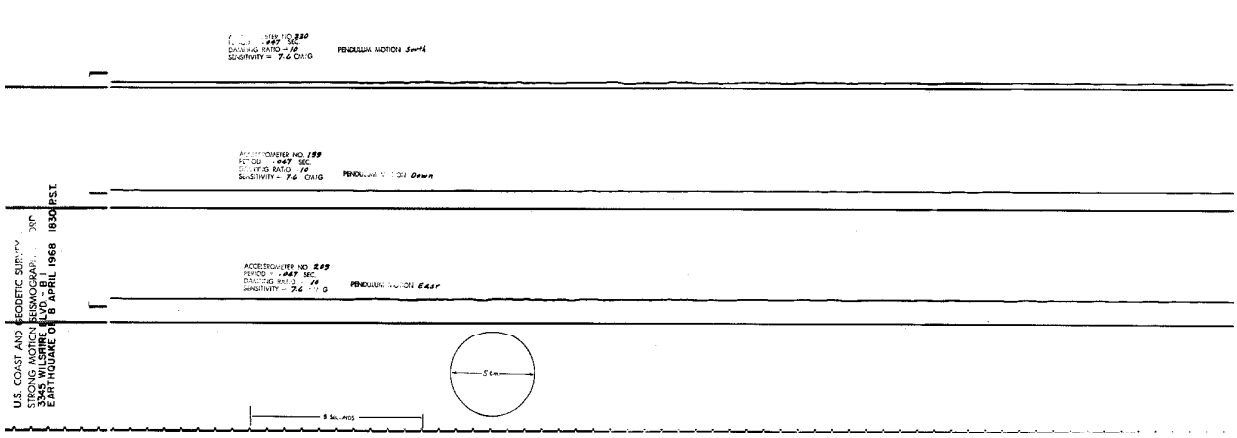
33a

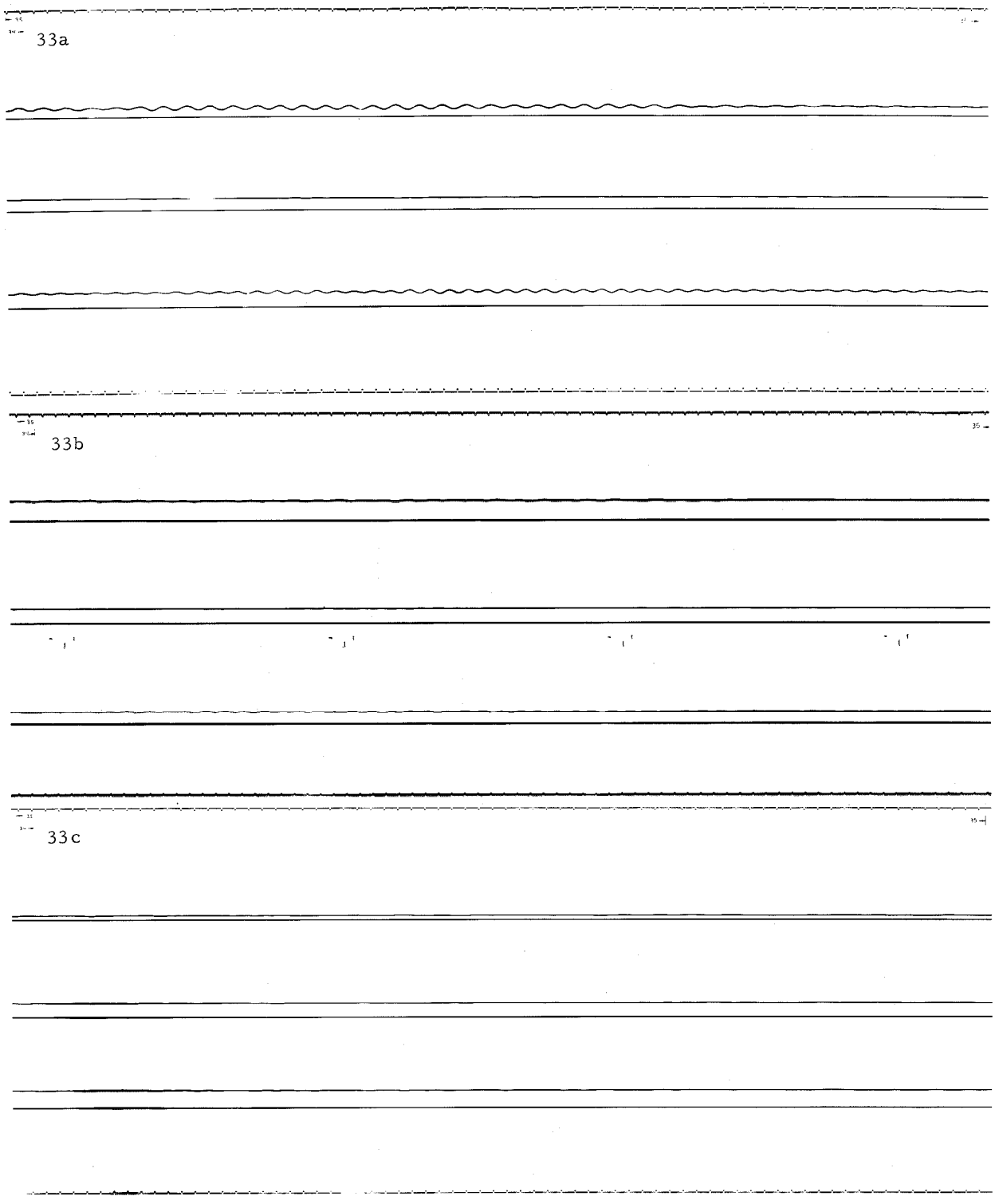

Sta. Coord.
34° 03' 39"N
118° 17' 43"W
PENDULUM MOTION South
PENDULUM MOTION Down
PENDULUM MOTION East
U.S. COAST AND GEODETIC SURVEY
STRONG MOTION SEISMOGRAPH RECORD
3345 WILSHIRE BLVD., 2ND. FLOOR
EARTHQUAKE OF 8 APRIL 1968 1830 PST.
5 cm
5 SECONDS

33b


Sta. Coord.
34° 03' 39"N
118° 17' 43"W
PENDULUM MOTION South
PENDULUM MOTION Down
PENDULUM MOTION East
U.S. COAST AND GEODETIC SURVEY
STRONG MOTION SEISMOGRAPH RECORD
3345 WILSHIRE BLVD., 2ND. FLOOR
EARTHQUAKE OF 8 APRIL 1968 1830 PST.
5 cm
5 SECONDS

33c

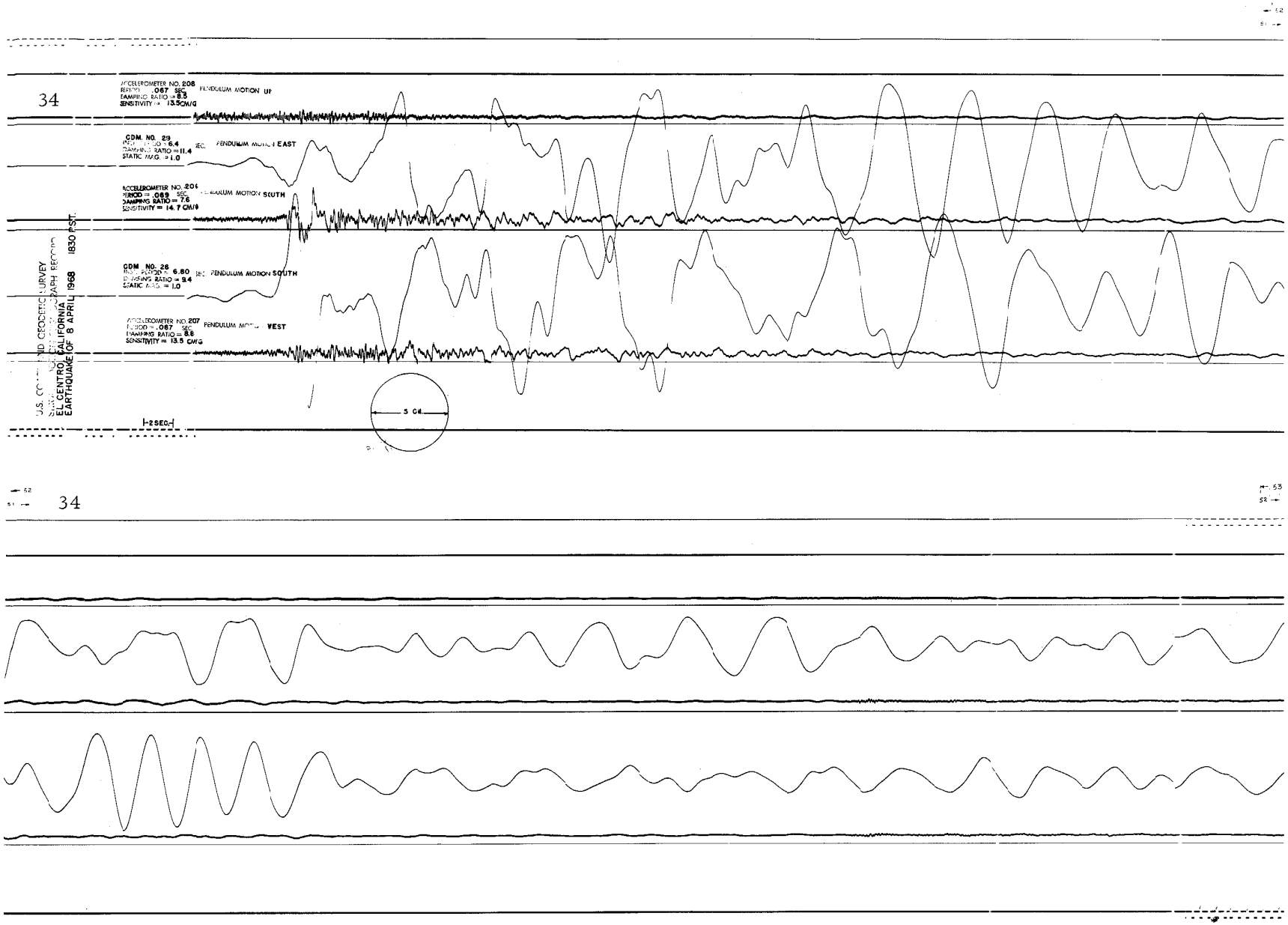

Sta. Coord.
34° 03' 39"N
118° 17' 43"W
PENDULUM MOTION South
PENDULUM MOTION Down
PENDULUM MOTION East
U.S. COAST AND GEODETIC SURVEY
STRONG MOTION SEISMOGRAPH RECORD
3345 WILSHIRE BLVD., 2ND. FLOOR
EARTHQUAKE OF 8 APRIL 1968 1830 PST.
5 cm
5 SECONDS

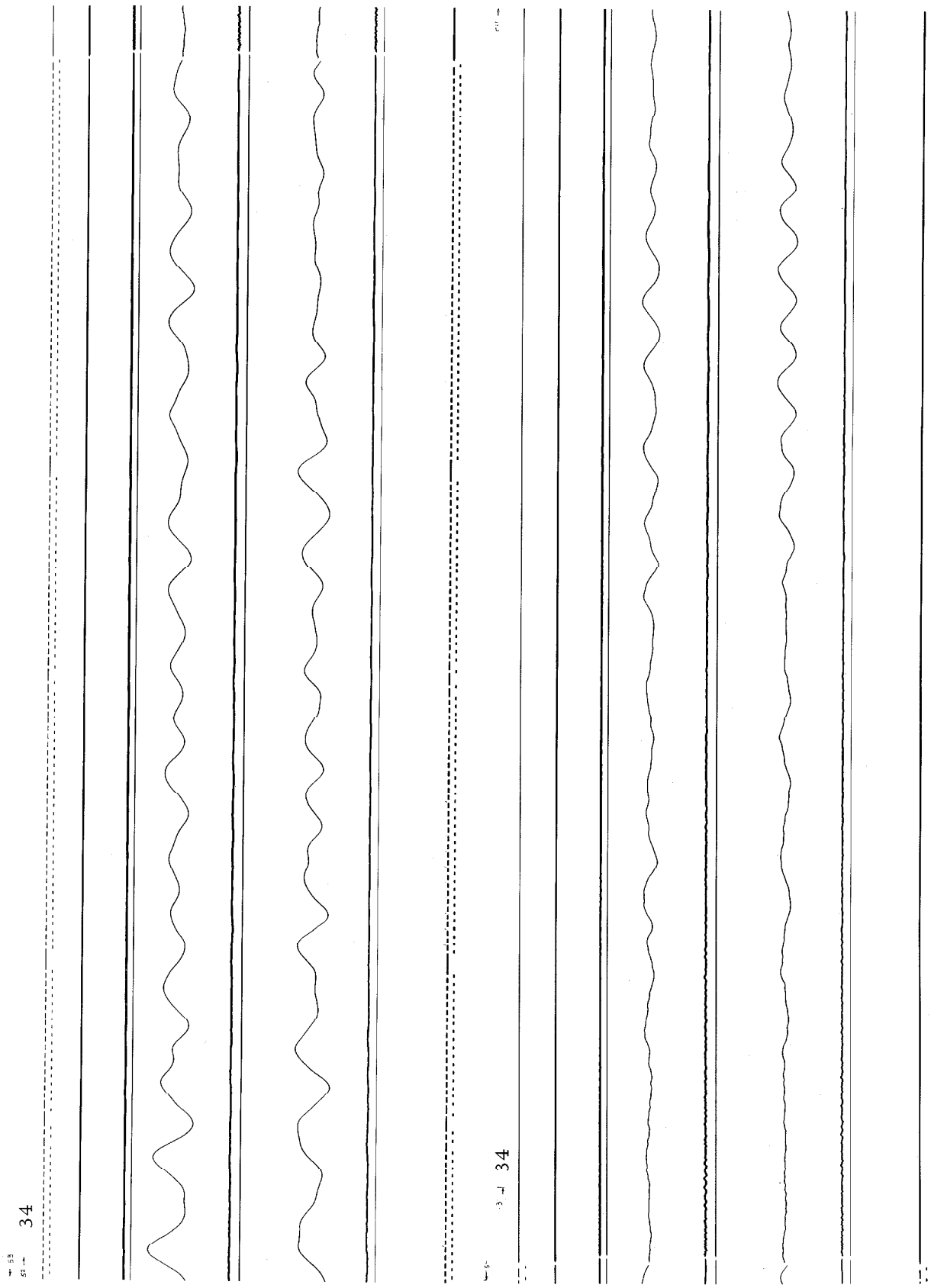


33a

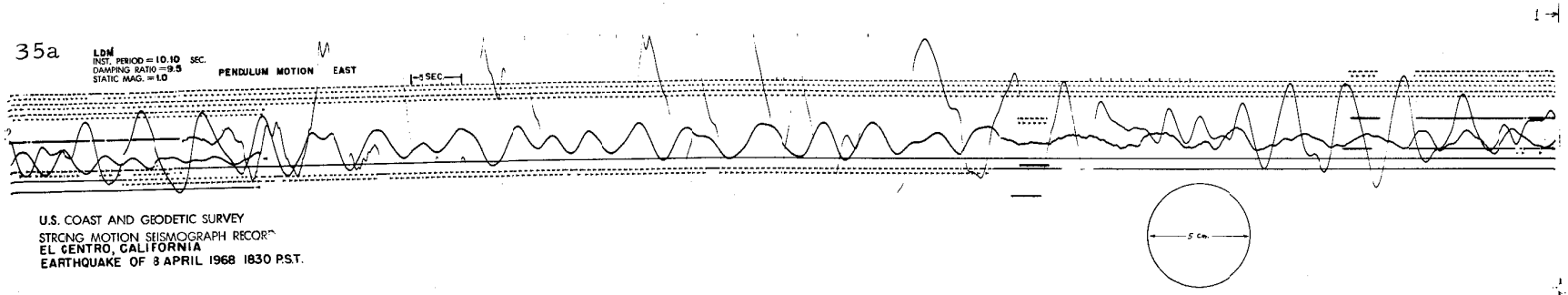
33b

33c


34
ACCELEROMETER NO. 208
PERIOD = .067 SEC
DAMPING RATIO = 8.5
SENSITIVITY = 13.5 CM/G
PENDULUM MOTION UP
CDM NO. 29
PERIOD = 6.4 SEC
DAMPING RATIO = 11.4
STATIC M.G. = 1.0
PENDULUM MOTION EAST
ACCELEROMETER NO. 206
PERIOD = .069 SEC
DAMPING RATIO = 7.6
SENSITIVITY = 14.7 CM/G
PENDULUM MOTION SOUTH
CDM NO. 28
PERIOD = 6.80 SEC
DAMPING RATIO = 8.4
STATIC M.G. = 1.0
PENDULUM MOTION SOUTH
ACCELEROMETER NO. 207
PERIOD = .067 SEC
DAMPING RATIO = 8.6
SENSITIVITY = 13.5 CM/G
PENDULUM MOTION WEST
5 CM
1-2 SEC-
U.S. COAST AND GEODETIC SURVEY
EL CENTRO, CALIFORNIA
EARTHQUAKE OF 8 APRIL 1968 1830 PST.
34

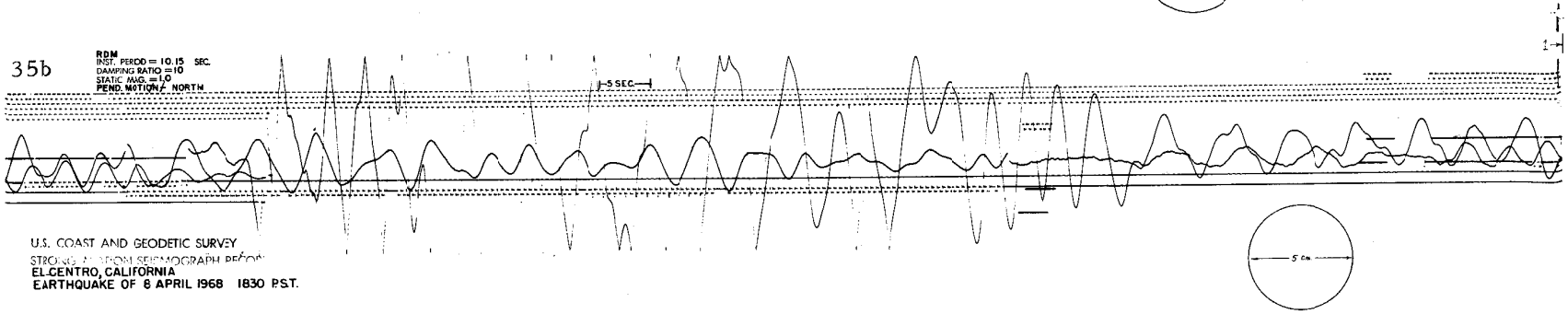

34
34

35a

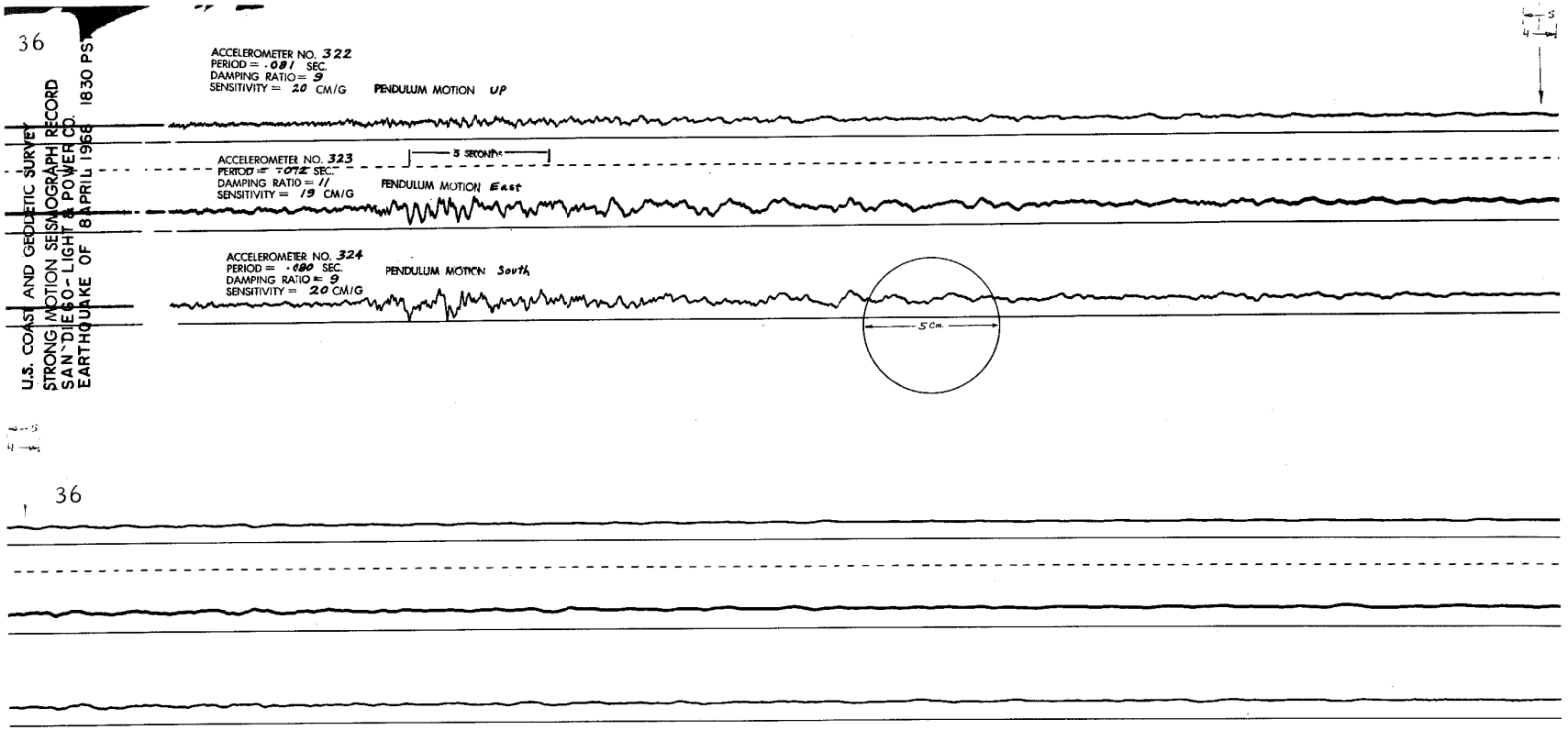


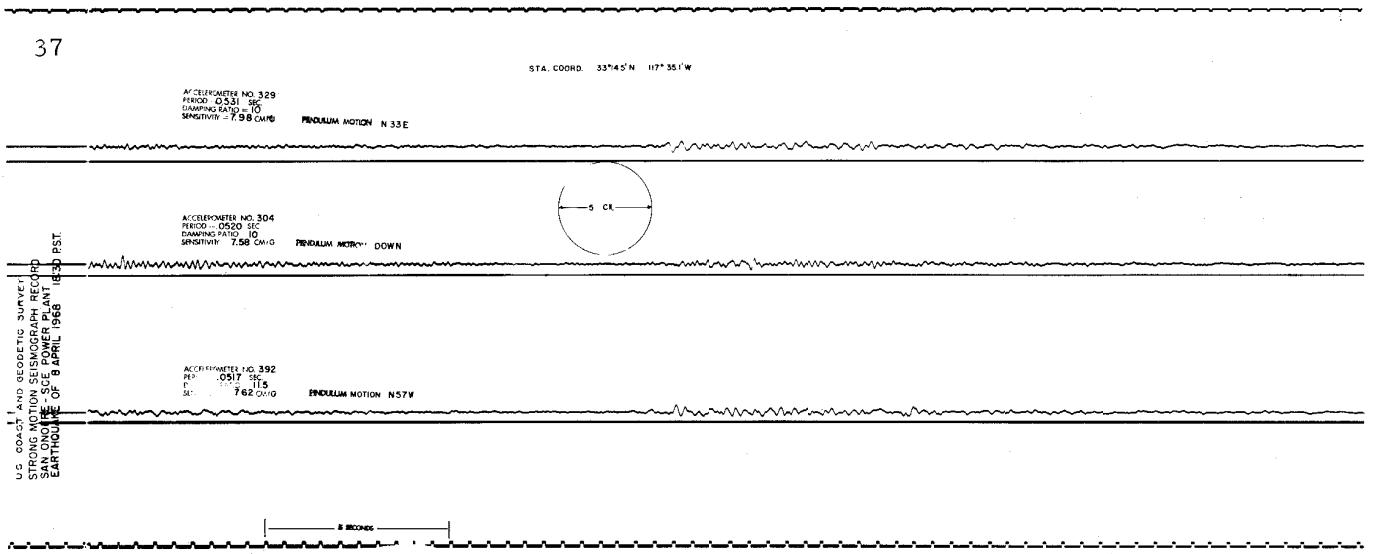
U.S. COAST AND GEODETIC SURVEY
STRONG MOTION SEISMOGRAPH RECORD
EL CENTRO, CALIFORNIA
EARTHQUAKE OF 8 APRIL 1968 1830 P.S.T.

35b

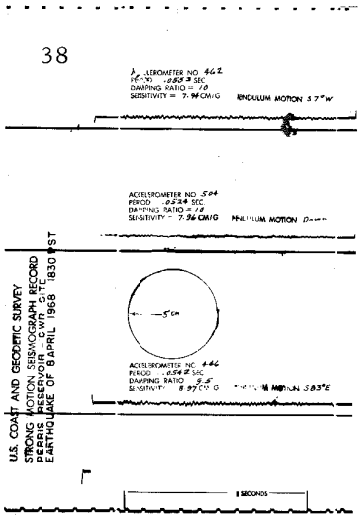


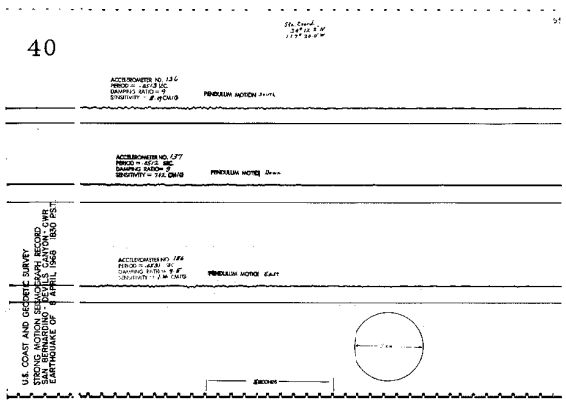
U.S. COAST AND GEODETIC SURVEY
STRONG MOTION SEISMOGRAPH RECORD
EL CENTRO, CALIFORNIA
EARTHQUAKE OF 8 APRIL 1968 1830 P.S.T.

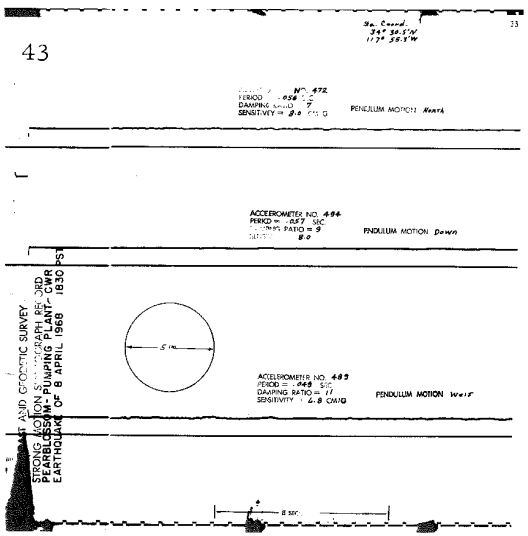

U.S. COAST AND GEODETIC SURVEY
STRONG MOTION SEISMOGRAPH RECORD
SAN DIEGO - LIGHT & POWER CO.
EARTHQUAKE OF 8 APRIL 1968 1830 PST
36
ACCELEROMETER NO. 322
PERIOD = .081 SEC.
DAMPING RATIO = 9
SENSITIVITY = 20 CM/G
PENDULUM MOTION UP
ACCELEROMETER NO. 323
PERIOD = .072 SEC.
DAMPING RATIO = 11
SENSITIVITY = 19 CM/G
5 SECONDS
PENDULUM MOTION East
ACCELEROMETER NO. 324
PERIOD = .080 SEC.
DAMPING RATIO = 9
SENSITIVITY = 20 CM/G
PENDULUM MOTION South
5 Cm.
5
36

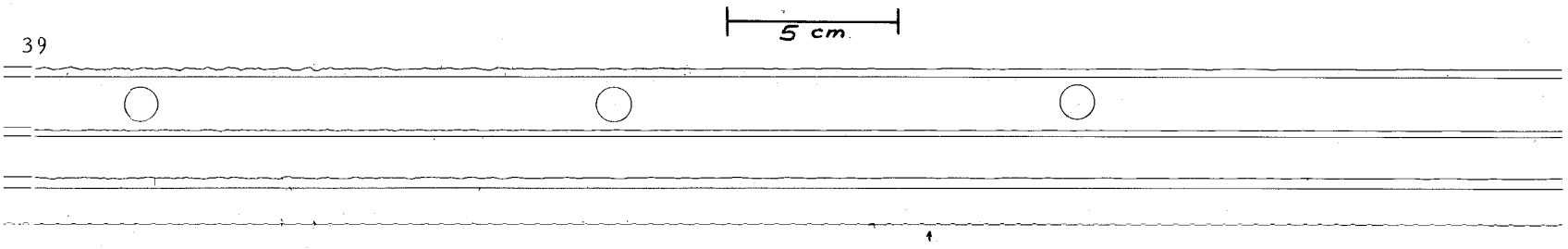

37
STA. COORD. 33°45'N 117° 35.1'W
ACCELEROMETER NO. 329
PERIOD 0.531 SEC
DAMPING RATIO = 10
SENSITIVITY = 7.98 CM/G
PENDULUM MOTION N 33E
ACCELEROMETER NO. 304
PERIOD = 0520 SEC
DAMPING RATIO 10
SENSITIVITY 7.58 CM/G
PENDULUM MOTION DOWN
5 CM
ACCELEROMETER NO. 392
PERIOD .0517 SEC
DAMPING RATIO 11.5
SENSITIVITY 7.62 CM/G
PENDULUM MOTION N57W
U.S. COAST AND GEODETIC SURVEY
STRONG MOTION SEISMOGRAPH RECORD
SAN ONOFRE NUCLEAR POWER PLANT
EARTHQUAKE OF 8 APRIL 1968 (1830 P.S.T.)
5 SECONDS

37


38
ACCELEROMETER NO. 462
PENDULUM MOTION S 7°W
ACCELEROMETER NO. 504
PENDULUM MOTION Down
5cm
ACCELEROMETER NO. 446
PENDULUM MOTION S83°E
U.S. COAST AND GEODETIC SURVEY
STRONG MOTION SEISMOGRAPH RECORD
SEAL BEACH, ORANGE CO.
EARTHQUAKE OF 8 APRIL 1968 1830 PST
5 SECONDS


40
ACCELEROMETER NO. 126
PENDULUM MOTION
ACCELEROMETER NO. 127
PENDULUM MOTION Down
ACCELEROMETER NO. 186
PENDULUM MOTION EAST
U.S. COAST AND GEODETIC SURVEY
STRONG MOTION SEISMOGRAPH RECORD
SAN BERNARDINO - RIVERSIDE CANYON, CALIF.
EARTHQUAKE OF 8 APRIL 1968 1830 PST
5 SECONDS


43
ACCELEROMETER NO. 472
PENDULUM MOTION North
ACCELEROMETER NO. 494
PENDULUM MOTION Down
ACCELEROMETER NO. 485
PENDULUM MOTION West
5 cm
U.S. COAST AND GEODETIC SURVEY
STRONG MOTION SEISMOGRAPH RECORD
PALM SPRINGS - DESERT AIRPORT
EARTHQUAKE OF 8 APRIL 1968 1830 PST


39
5 cm.

4la

Sta. Coord
34° 00'N
117° 19'W

ACCELEROMETER NO. 253
PERIOD = .066 SEC.
DAMPING RATIO = .70
SENSITIVITY = 13.1 CM/G
PENDULUM MOTION UP

5 SECONDS

ACCELEROMETER NO. 254
PERIOD = .065 SEC.
DAMPING RATIO = .70
SENSITIVITY = 14.0 CM/G
PENDULUM MOTION East

5 Cm.

ACCELEROMETER NO. 255
PERIOD = .065 SEC.
DAMPING RATIO = .70
SENSITIVITY = 13.2 CM/G
PENDULUM MOTION South

U.S. COAST AND GEODETIC SURVEY
STRONG MOTION SEISMOGRAPH RECORD
COLTON - S. CALIF. EDISON CO.
EARTHQUAKE OF 8 APRIL 1968 1830 PST

41b

L DM
INST. PERIOD = 9.75 SEC.
DAMPING RATIO = .70
STATIC MAG. = 1

PENDULUM MOTION North

5 SECONDS

5 Cm.

U.S. COAST AND GEODETIC SURVEY
STRONG MOTION SEISMOGRAPH RECORD
S. CALIF. EDISON CO. - COLTON
EARTHQUAKE OF 8 APRIL 1968 1830PST

41c

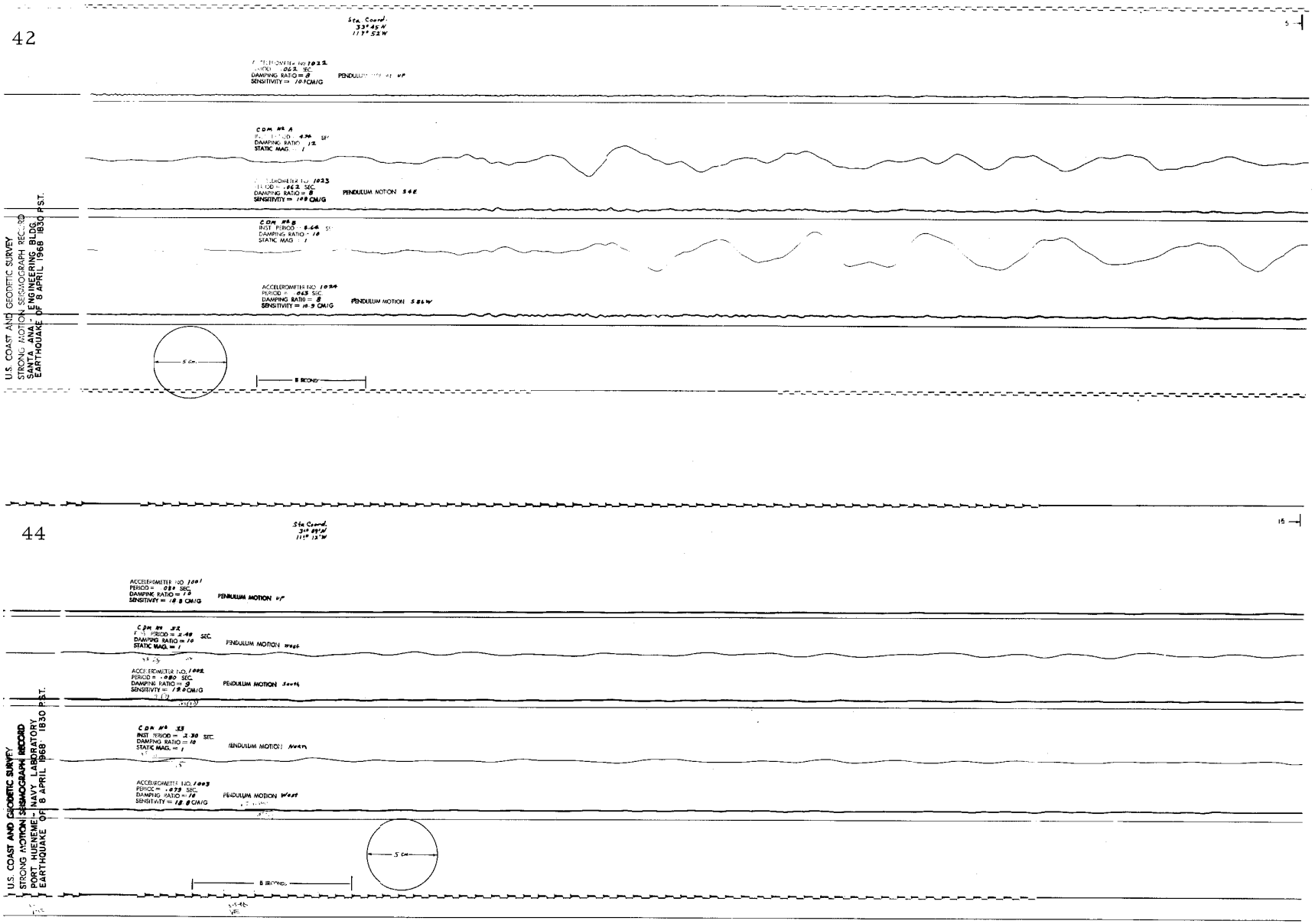
R DM
INST. PERIOD = 9.76 SEC.
DAMPING RATIO = .70
STATIC MAG. = 1

5 SECONDS

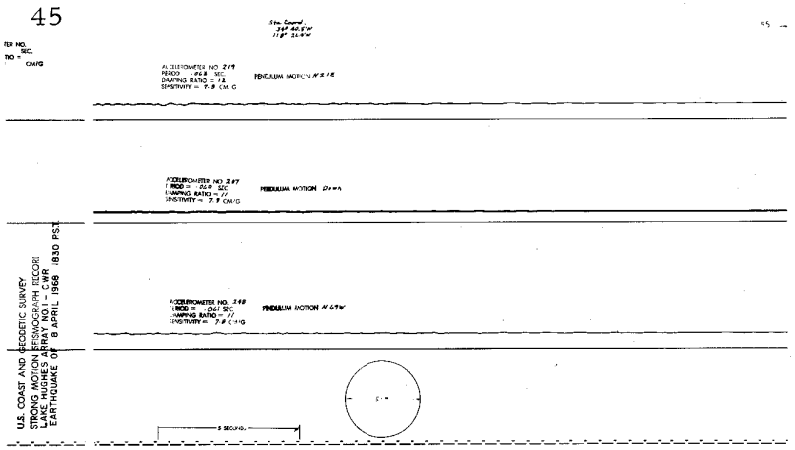
PENDULUM MOTION West

5 Cm.

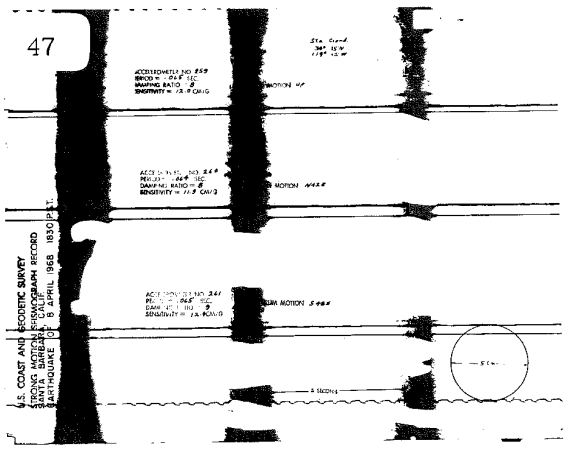
U.S. COAST AND GEODETIC SURVEY
STRONG MOTION SEISMOGRAPH RECORD
COLTON - S. CALIF. EDISON CO.
EARTHQUAKE OF 8 APRIL 1968 1830PST


42
Sta. Coord.
33° 45' N
117° 52' W
ACCELEROMETER NO. 1022
PERIOD = .062 SEC.
DAMPING RATIO = .6
SENSITIVITY = 107 CM/G
PENDULUM MOTION up
COM ## A
PERIOD = 4.76 SEC.
DAMPING RATIO = .12
STATIC MAG. = 1
ACCELEROMETER NO. 1023
PERIOD = .062 SEC.
DAMPING RATIO = .6
SENSITIVITY = 109 CM/G
PENDULUM MOTION S 6 E
COM ## B
INST. PERIOD = 5.64 SEC.
DAMPING RATIO = .10
STATIC MAG. = 1
ACCELEROMETER NO. 1024
PERIOD = .063 SEC.
DAMPING RATIO = .6
SENSITIVITY = 10.9 CM/G
PENDULUM MOTION S 86 W
5 Cm.
5 SECONDS
U.S. COAST AND GEODETIC SURVEY
STRONG MOTION SEISMOGRAPH RECORD
SANTA ANA - ENGINEERING BLDG.
EARTHQUAKE OF 8 APRIL 1968 1830 P.S.T.
44
Sta Coord.
34° 09' N
117° 12' W
ACCELEROMETER NO. 1001
PERIOD = .059 SEC.
DAMPING RATIO = .70
SENSITIVITY = 18.8 CM/G
PENDULUM MOTION up
COM ## 12
PERIOD = 2.49 SEC.
DAMPING RATIO = .10
STATIC MAG. = 1
PENDULUM MOTION West
ACCELEROMETER NO. 1002
PERIOD = .080 SEC.
DAMPING RATIO = .6
SENSITIVITY = 18.8 CM/G
PENDULUM MOTION South
COM ## 13
INST. PERIOD = 2.20 SEC.
DAMPING RATIO = .10
STATIC MAG. = 1
PENDULUM MOTION North
ACCELEROMETER NO. 1003
PERIOD = .079 SEC.
DAMPING RATIO = .70
SENSITIVITY = 18.8 CM/G
PENDULUM MOTION West
5 Cm.
5 SECONDS
U.S. COAST AND GEODETIC SURVEY
STRONG MOTION SEISMOGRAPH RECORD
PORT HUENEME - NAVY LABORATORY
EARTHQUAKE OF 8 APRIL 1968 1830 P.S.T.

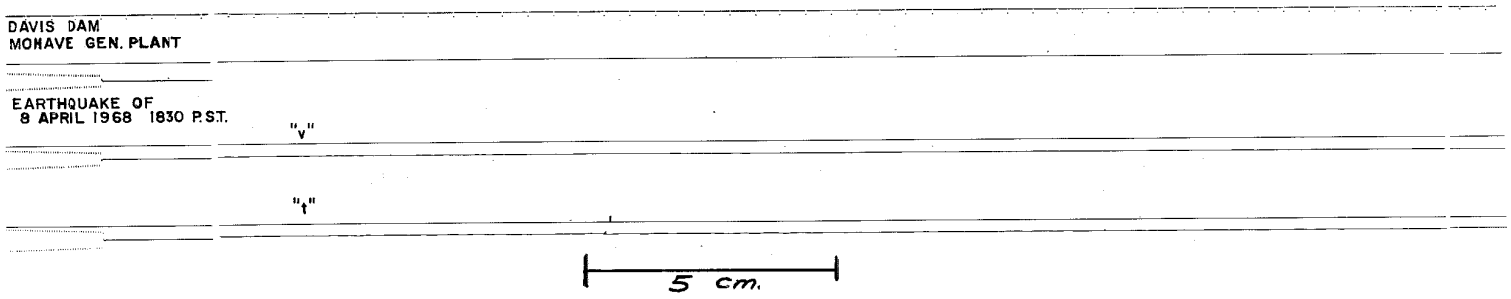
45


U.S. COAST AND GEODETIC SURVEY
STRONG MOTION SEISMOGRAPH RECORD
LAKE HUGHES ARRAY NO.1 - CWR
EARTHQUAKE OF 8 APRIL 1968 1830 P.S.T.

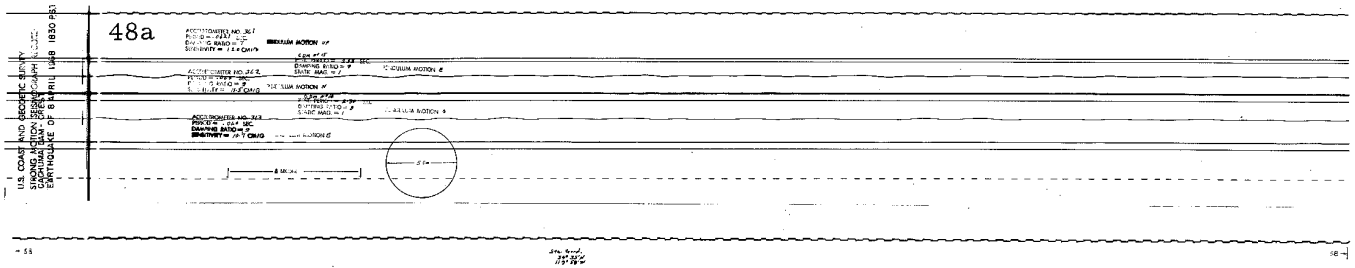
47


U.S. COAST AND GEODETIC SURVEY
STRONG MOTION SEISMOGRAPH RECORD
LAKE HUGHES ARRAY NO.1 - CWR
EARTHQUAKE OF 8 APRIL 1968 1830 P.S.T.

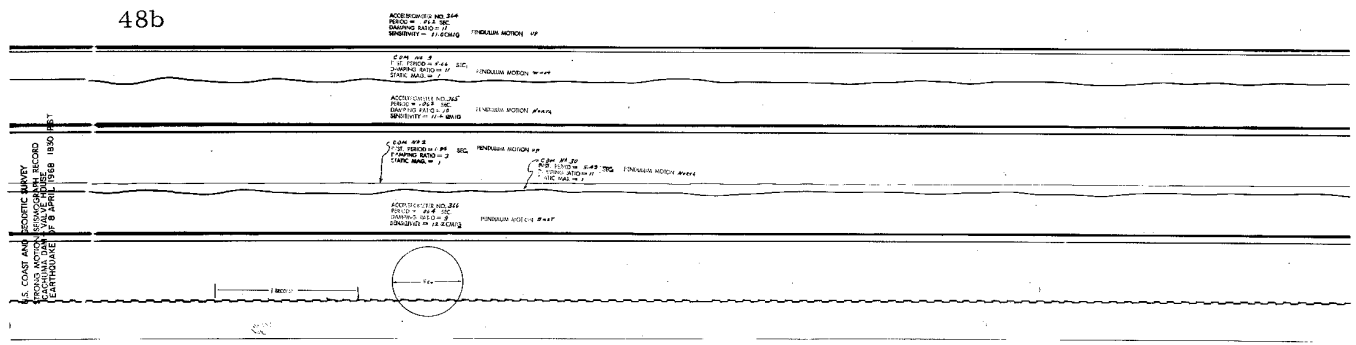
46


DAVIS DAM
MOHAVE GEN. PLANT
EARTHQUAKE OF
8 APRIL 1968 1830 P.S.T.
"V"
"T"
5 cm.

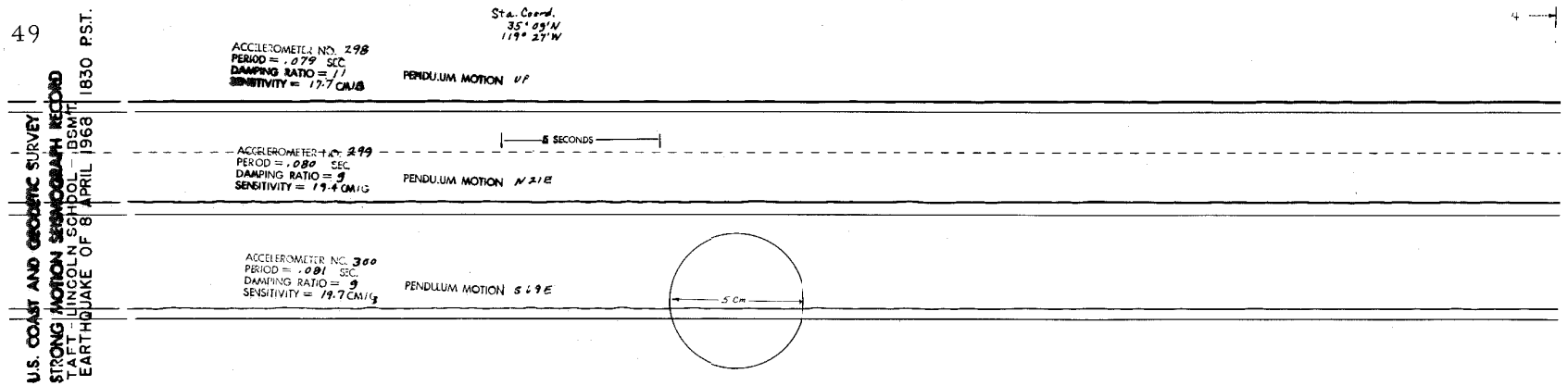
48a



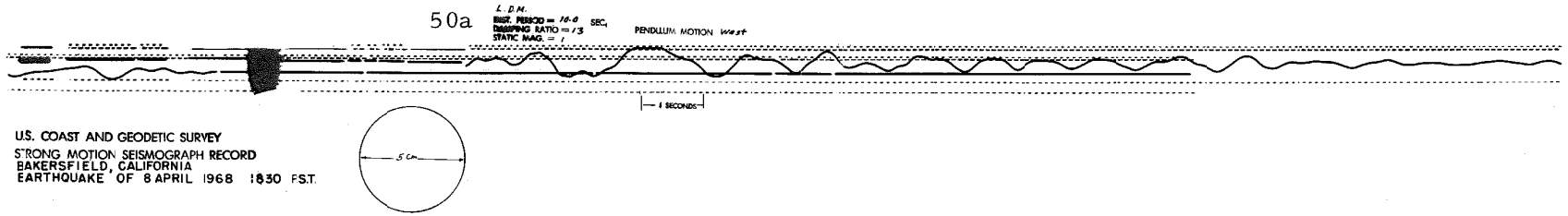
48b



49

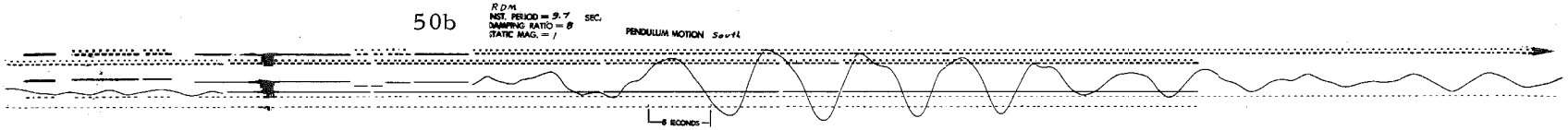

U.S. COAST AND GEODETIC SURVEY
STRONG MOTION SEISMOGRAPH RECORD
TAFT - LINCOLN SCHOOL - BSMT
EARTHQUAKE OF 8 APRIL 1968 1830 P.S.T.
Sta. Coord.
35° 09'N
119° 27'W
ACCELEROMETER NO. 298
PERIOD = .079 SEC.
DAMPING RATIO = .11
SENSITIVITY = 17.7 CM/G
PENDULUM MOTION UP
5 SECONDS
ACCELEROMETER NO. 299
PERIOD = .080 SEC.
DAMPING RATIO = .9
SENSITIVITY = 19.4 CM/G
PENDULUM MOTION N21E
ACCELEROMETER NO. 300
PERIOD = .081 SEC.
DAMPING RATIO = .9
SENSITIVITY = 19.7 CM/G
PENDULUM MOTION S69E
5 Cm

50a



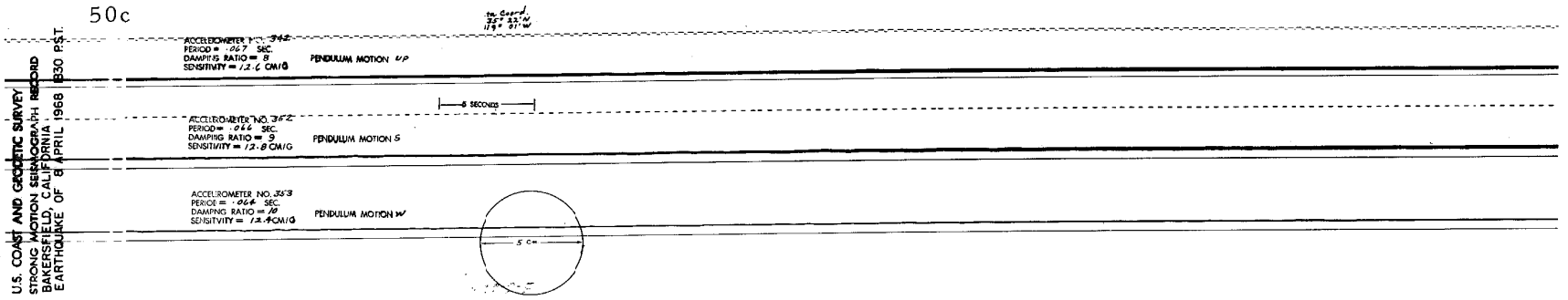
U.S. COAST AND GEODETIC SURVEY
STRONG MOTION SEISMOGRAPH RECORD
BAKERSFIELD, CALIFORNIA
EARTHQUAKE OF 8 APRIL 1968 1830 P.S.T.

50b



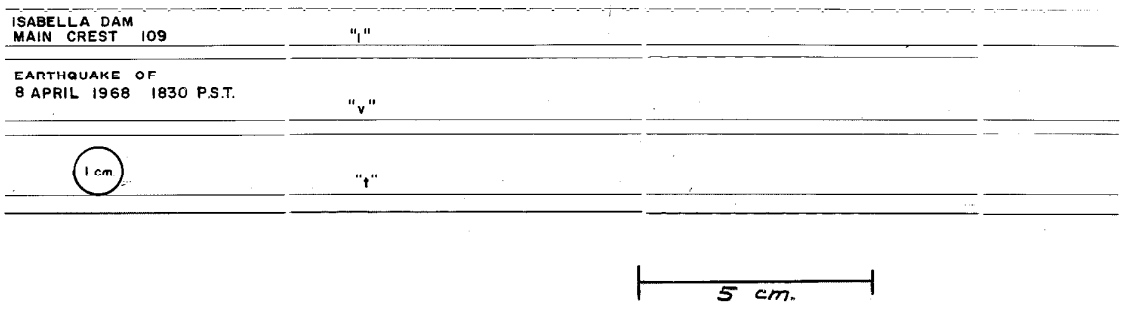
U.S. COAST AND GEODETIC SURVEY
STRONG MOTION SEISMOGRAPH RECO
BAKERSFIELD, CALIFORNIA
EARTHQUAKE OF 8 APRIL 1968 30 P.S.T.

50c

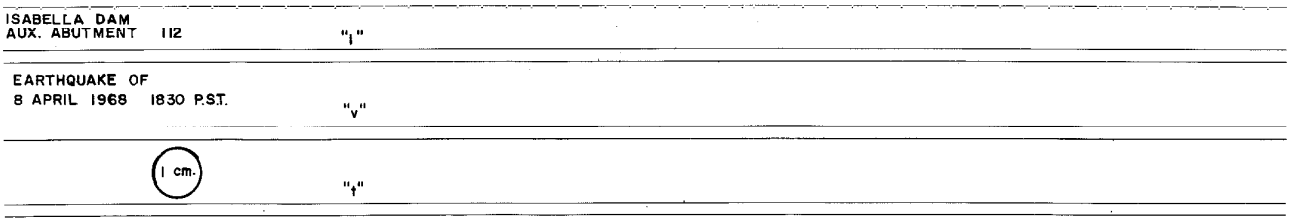


U.S. COAST AND GEODETIC SURVEY
STRONG MOTION SEISMOGRAPH RECORD
BAKERSFIELD, CALIFORNIA
EARTHQUAKE OF 8 APRIL 1968 1830 P.S.T.

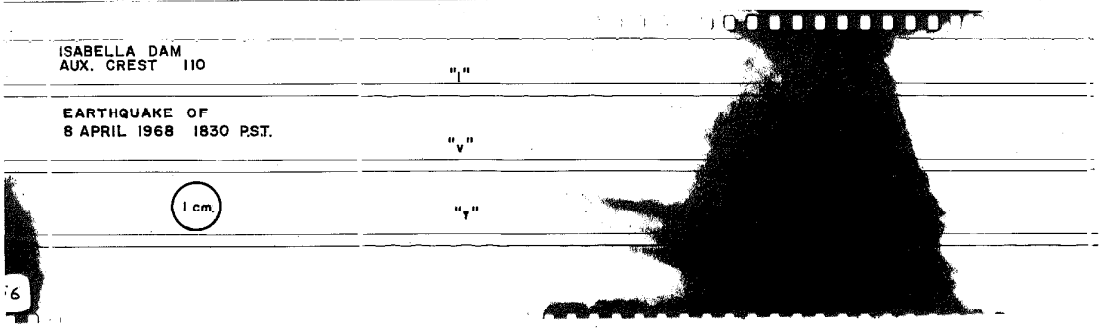
51a



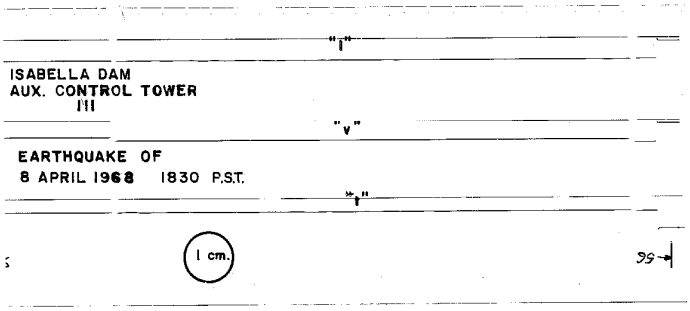
51b



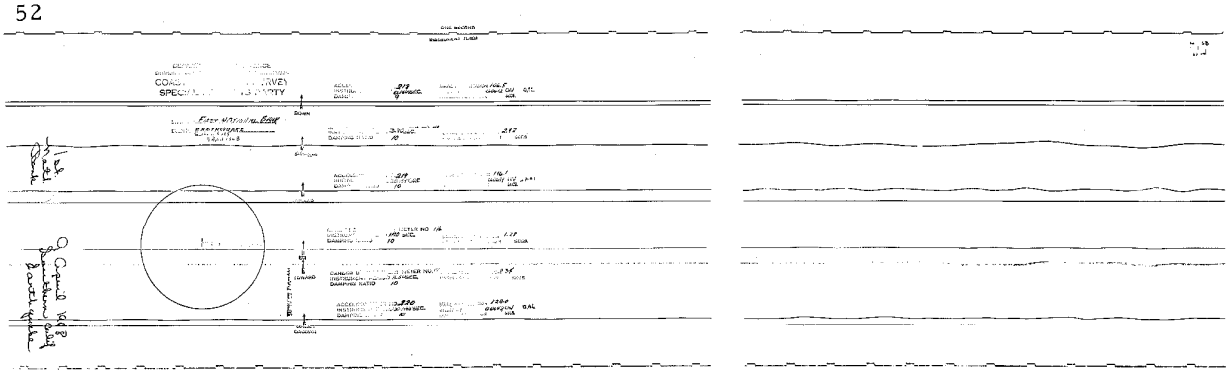
51c



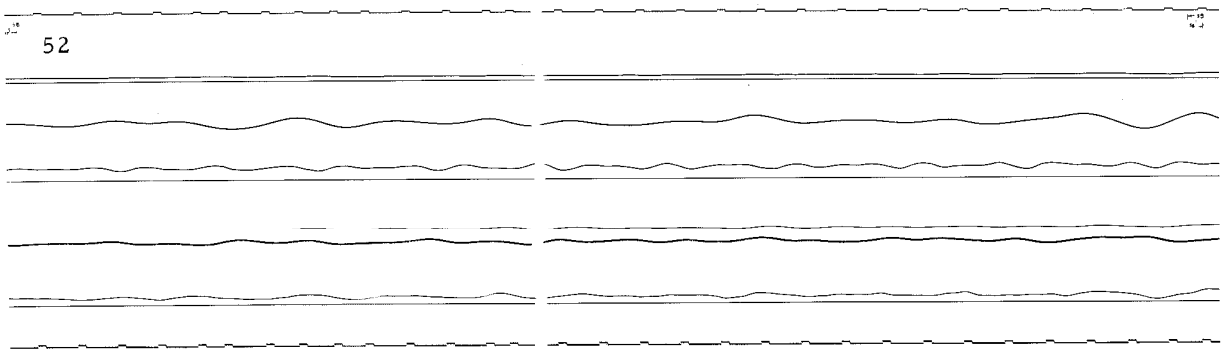
51d



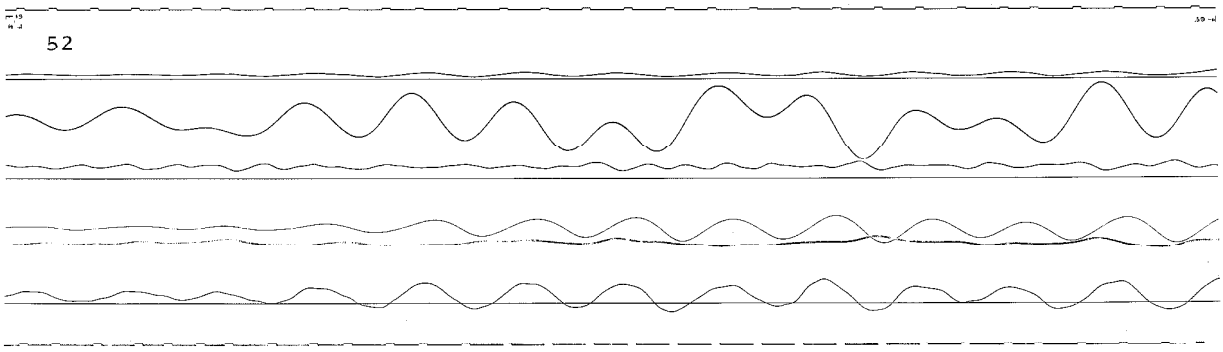
52



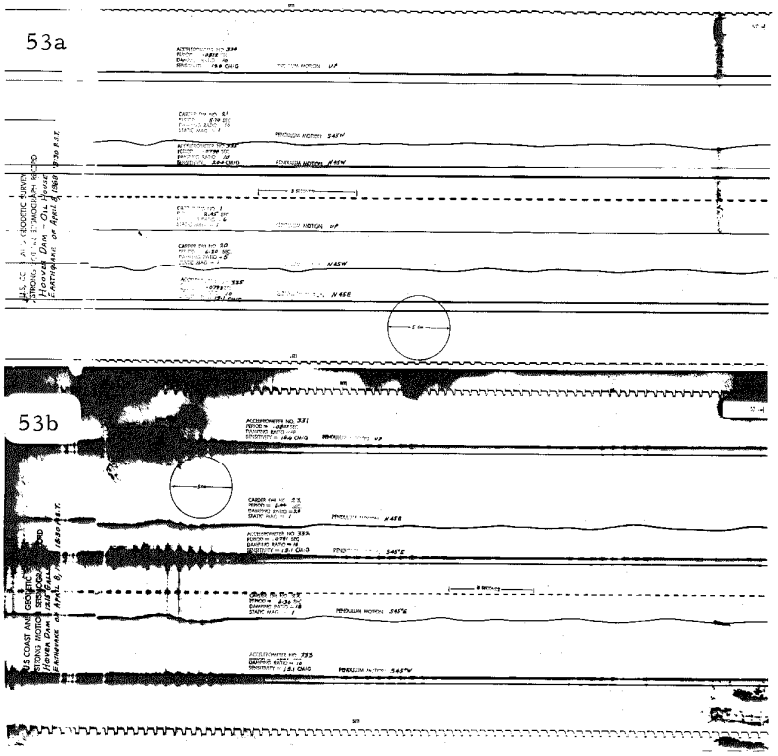
52



52



53a



53b

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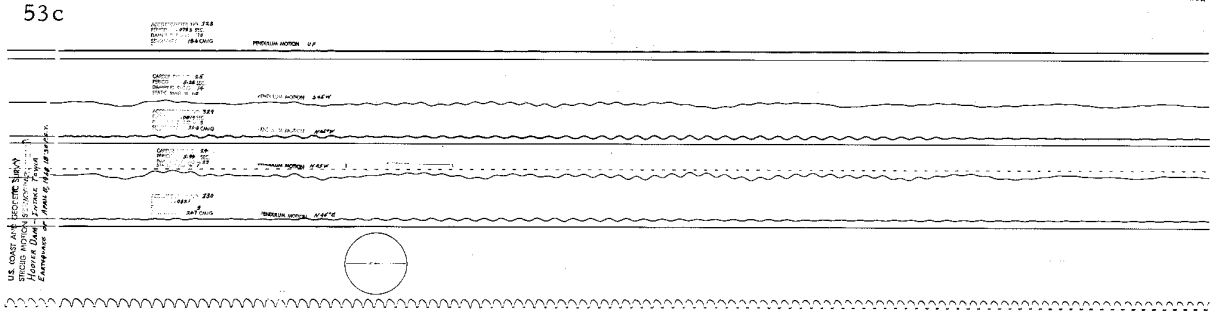

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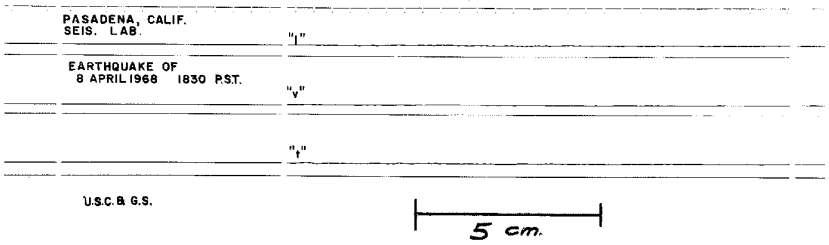
54



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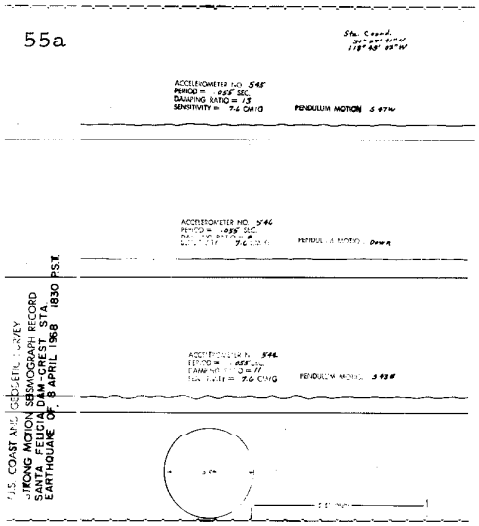

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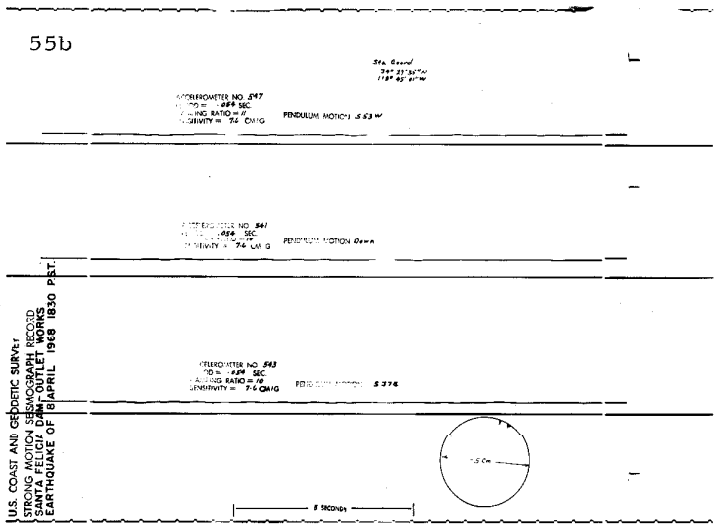

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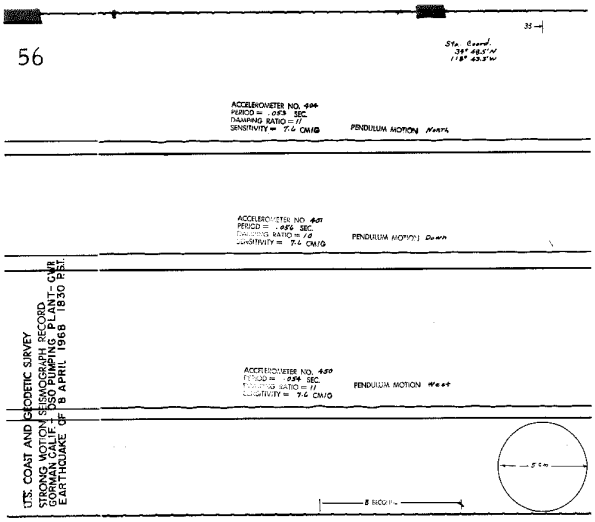

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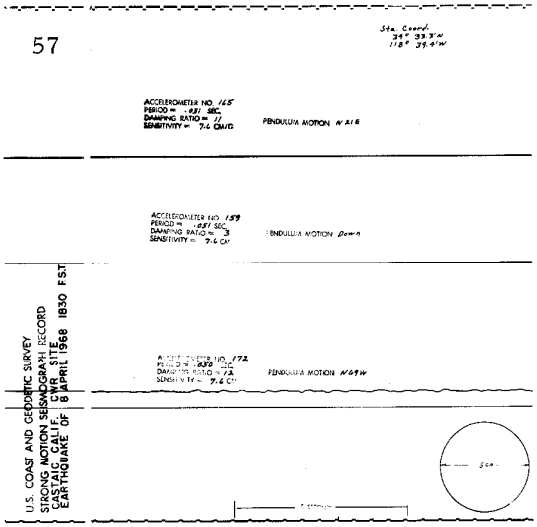
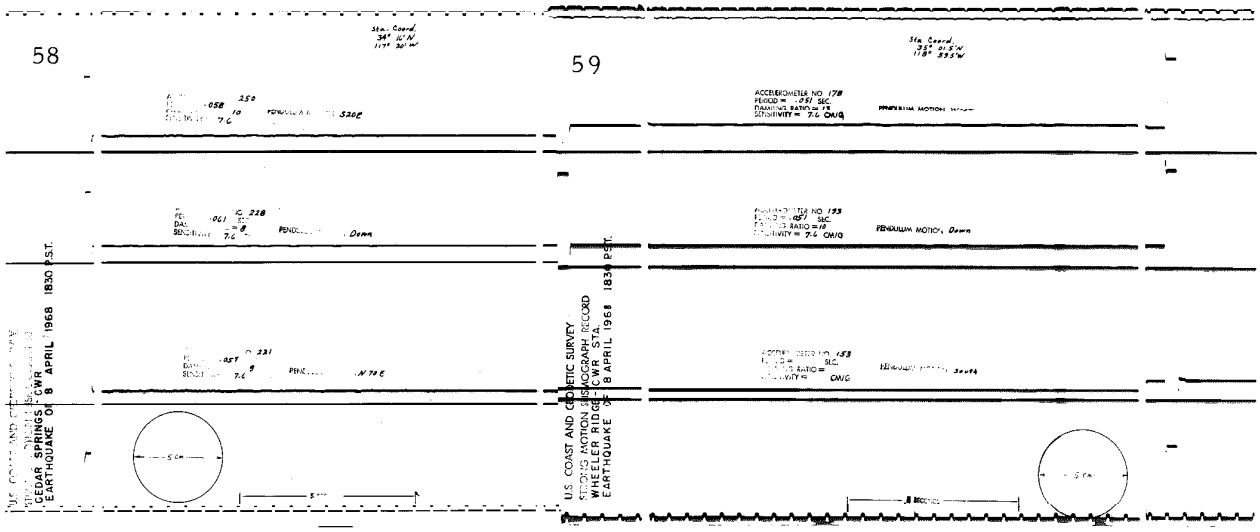
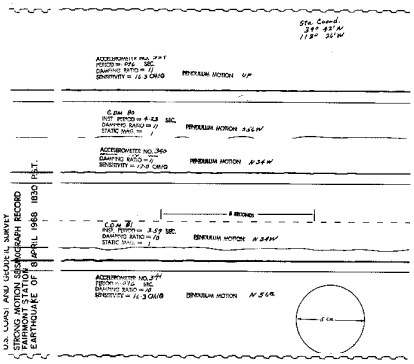
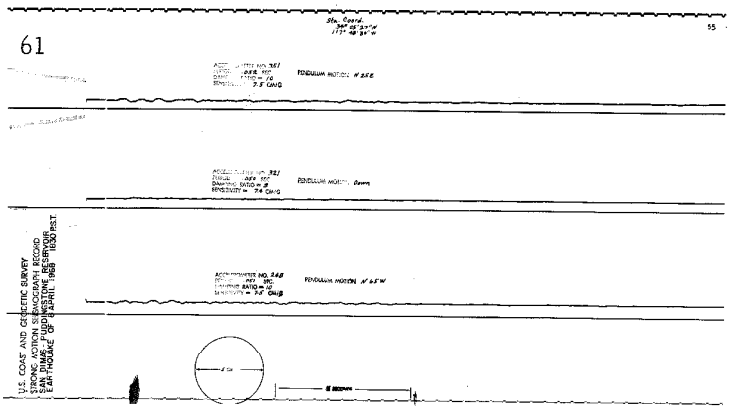
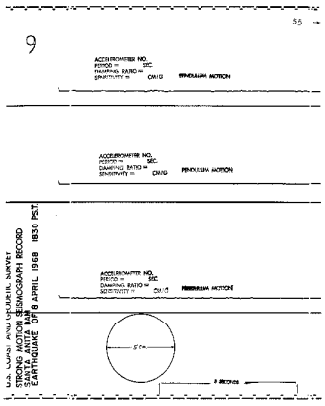



58
59
U.S. COAST AND GEODETIC SURVEY
STRONG MOTION SEISMOGRAPH RECORD
CEDAR SPRINGS, S.C.W.R. STA.
EARTHQUAKE OF 8 APRIL 1968 1830 P.S.T.
WHEELER RIDGE, C.W.R. STA.
EARTHQUAKE OF 8 APRIL 1968 1830 P.S.T.
PENDULUM MOTION, Down


60
U.S. COAST AND GEODETIC SURVEY
STRONG MOTION SEISMOGRAPH RECORD
PARKFIELD, CALIF.
EARTHQUAKE OF 8 APRIL 1968 1830 P.S.T.


61
U.S. COAST AND GEODETIC SURVEY
STRONG MOTION SEISMOGRAPH RECORD
SAN FERNANDO, C.W.R. STA.
EARTHQUAKE OF 9 APRIL 1968 1830 PST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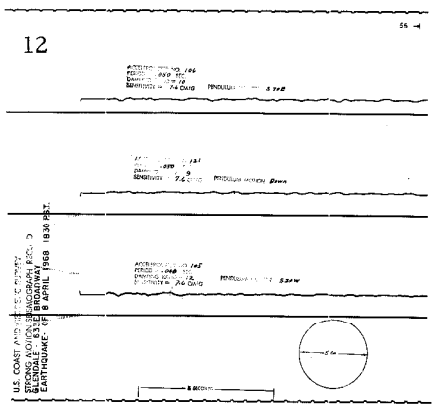
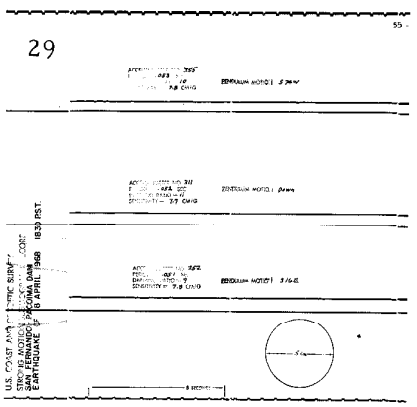
U.S. COAST AND GEODETIC SURVEY
STRONG MOTION SEISMOGRAPH RECORD
SANTA ANA, CALIF.
EARTHQUAKE OF 8 APRIL 1968 1830 PST


12
U.S. COAST AND GEODETIC SURVEY
STRONG MOTION SEISMOGRAPH RECORD
EARTHQUAKE OF 8 APRIL 1968 1830 PST


29
U.S. COAST AND GEODETIC SURVEY
STRONG MOTION SEISMOGRAPH RECORD
EARTHQUAKE OF 8 APRIL 1968 1830 PST